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GOVERNMENT REPORTS

Announcements & Index

2

January 16, 1981

U.S. Department of Commerce
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GOVERNMENT REPORTS

Announcements & Index

Volume 81, Number 2 January 16, 1981

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SAMPLE ENTRY

Field 12—MATHEMATICAL SCIENCES
Group 12A—Mathematics and Statistics
PB80-104045 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Constructed Facilities Div.
Computation of Hankel Transforms Using the Fast-Fourier Transform Algorithm,
E. Kausel, and G. Bouckovalas. Aug 79, 49p
R79-12, NSF/RA-79-12, NSF/RA-790206
Grant NSF-ENV77-18339

An efficient numerical procedure is presented for the computation of Hankel Transforms. The algorithm is based on the expression of the Hankel Transform in terms of a two-dimensional Fourier Transform, which is then reduced to only one dimension. The latter is then evaluated with the Fast Fourier Transform algorithm. Examples are presented, and a listing of the computer program included.

NTIS Subject Category
NTIS Subcateogry
NTIS order number Availability/Price codes
Corporate or Performing Organization

Report title

Personal authors Report date Page count
Report number(s)
Contract or grant number(s)

Abstract

1. AERONAUTICS

1A. Aerodynamics

AD-A089 239/8 PC **A19**/MF **A01**
Air Force Wright Aeronautical Labs Wright-Patterson AFB OH
Viscous and Interacting Flow Field Effects.
Technical rept. Apr 79-Apr 80,
Anthony W. Fiore. Jun 80, 437p Rept no. AFWAL-TR-80-3088
Proceedings of the U.S. Air Force and the Federal Republic of Germany Data Exchange Agreement Meeting (5th) Held at the U.S. Naval Academy, Annapolis, MD, 15-17 Apr 80, Number MWDDEA-AF-75-G-7440.

The Data Exchange Agreement's purpose was to exchange data in the area of boundary layer research. It included both experimental and theoretical boundary layer research at speeds from subsonic to hypersonic Mach numbers in the presence of laminar, transitional, and turbulent boundary layers. The main effort in recent years has been on turbulent boundary layers, both attached and separated in the presence of such parameters as pressure gradients, wall temperature, surface roughness, etc.

AD-A089 439/4 PC **A03**/MF **A01**
Advisory Group for Aerospace Research and Development Neuilly-sur-Seine (France)
Mathematical Modeling of Linear and Non-Linear Aircraft Structures.
Jul 80, 41p Rept no. AGARD-R-687

The mathematical modeling of aircraft structures (for instance by finite elements) is used, from the very beginning of a design, to determine the flutter boundaries and the dynamics of the aircraft. Once the prototype is built, extensive vibration tests take place in order to compare the theoretical prediction with the actual natural modes and frequencies. Discrepancies then appear, especially for wing-store configurations, that must be explained and the mathematical model must be modified to fit the experimental results. The authors addressed two different aspects of the problem in their presentations at the Spring 1980 Meeting of the Structures and Materials Panel in Athens: In his paper, Zimmermann proposes adjustment algorithms for

improving the theoretically obtained flexibility and mass distributions of a structure by dynamic or ground resonance tests. On the other hand, De Ferrari, Chesta, Sensburg and Lotze deal with the non-linear behaviour of wing-store configurations and its analytical representation. They draw clear conclusions on the excitation amplitudes at which flutter could occur. The two papers provide a very important contribution to the understanding of some difficult aeroelastic problems and will be very useful to the NATO community.

AD-A089 496/4 PC **A05**/MF **A01**
TRW Systems and Energy Redondo Beach CA Engineering Sciences Lab
Holographic Investigation of Slender Body Vortex Wakes.
Final rept. 28 Jul 78-28 Mar 80,
F. D. Deffenbaugh, and J. L. Jacoby. Jul 80, 79p
TRW-32399-6002-UT-00, AFWAL-TR-80-3061
Contract F33615-78-C-3028

The three dimensional vortex flow field behind slender missile configurations at high angle of attack was investigated using laser holography. Holographic interferograms of the flow about two ogive cylinder models were recorded for low speed flows, M less than .1, at angles of attack from 20 to 50 degrees. Helium injected into the flow above the model was entrained into the entire vortex structure, and the three dimensional position of the core could not be determined from the interferograms. Dual exposure holograms of the flow field seeded with 40-100 micron glass microballoons were recorded using a pulsed ruby laser. Pairs of particles could not be easily identified in the reconstructed image and the three dimensional velocity field could not be measured. Surface pressures were measured and inlegrated to provide load distributions, normal and side force coefficients. Roll angle was varied with angle of attack and tunnel conditions constant. Conditions of maximum vortex asymmetry were determined from the measured pressure distributions. (Author)

N80-31352/1 PC **A15**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Fluid Dynamics Research Lab.
An Asymptotic Unsteady Lifting-Line Theory with Energetics and Optimum Motion of Thrust-Producing Lifting Surfaces.
Final Report.
A. R. Ahmadi. Sep 80, 345p NASA-CR-163526, MIT-80-2
Contract NGR-22-009-818

A low frequency usteady lifting line theory was developed for a harmonically oscillating wing of large aspect ratio. This wing was assumed to be chordwise rigid but completely flexible in the span direction. The theory was developed by use of the method of matched asymptotic expansions which reduces the problem from a singular integral equation to quadrature. The wing displacements were prescribed and the pressure field, airolads and unsteady induced downwash were obtained in closed form. The influence of reduced frequency aspect ratio, planform shape and mode of oscillation on wing aerodynamics was demonstrated through numerical examples. Compared with lifting surface theory computation time was reduced significantly.

N80-31361/2 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Scientific Services Div.
Design of a Calculation Method for Three Dimensional Turbulent Boundary Layers.
J. P. F. Lindhout, and B. Vandenberg. 29 Nov 79, 14p NLR-MP-79036-U
Contract NIVR-1820
Presented at the 3D Gamm Conf. On Numerical Methods in Fluid Mech., Cologne, 10-12 Oct. 1979.

An engineering method is presented to compute the three dimensional laminar and turbulent boundary layer flow over nondevelopable surfaces. Turbulence phenomena are described by a simple eddy viscosity model. The method was organized to enhance its user oriented properties. The organization and the numerics are discussed in the framework of relational diagrams which elucidate the relations between information sets and processes. Results are shown for the laminar flow over a flat plate with an attached cylinder and for the turbulent flow over the root section of an aircraft wing.

N80-31362/0 PC **A02**/MF **A01**
Aeronautical Research Inst. of Sweden, Stockholm. Aerodynamics Dept.
Calculations by a First Order Theory of Supersonic Flow around delta Wings.
S. G. Hedman. 1980, 22p FFA-TN-AU-810
Contract FMV-F-INK-11-12-93490

Preliminary calculations of delta wings in supersonic flow were made with a method based on theoretical work of Oswatitsch and Sun. The flow field is computed with acoustic theory for an image wing in the characteristic space. Following that, the real wing's coordinates in physical space are calculated. The planform of the image wing must be modified until the corresponding real wing has obtained the wanted shape. The theory is of first order accuracy expressed in the characteristic variables. Traces of the characteristics in physical space and bow shock waves were found for cases with wings with and without incidence. As the wing disturbances increase it becomes more difficult to give to the real wing the wanted shape. The possible practical use of the method is probably limited to slender wings at small incidences.

N80-31363/8 PC **A05**/MF **A01**
Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
Contribution to the Study of Supersonic Laminar Separation: Utilization and Improvements in Integral Methods of Calculation.
Ph.D. Thesis - Lille Univ.
G. About. 1980, 90p ONERA-NT-1980-1, ISSN-0078-3781
Text in French; English Summary. Report Will Also Be Announced as Translation (Esa-TT-662).

Calculations were performed on supersonic layer separation phenomena by solving coupled perfect fluid equations and integral form boundary layer equations. Three types of improvements are suggested: definition of similitude profiles approximated by a simple analytical representation and the use of a second order boundary layer formulation proposed by Crocco, adaptation of Le Balleur's numerical method and its application to separated and reattaching flow on a compression ramp or under shock wave reflection conditions; and determination of three parameter velocity profiles able to take sublaminar layers into account and their utilization in a three moment integral method as suggested by Crocco.

N80-31364/6 PC **A07**/MF **A01**
Royal Aircraft Establishment, Farnborough (England). Aerodynamics Dept.
An Investigation of Scale Effects on the Transonic Flow over Swept Wings. Part 1: Measurements on a Model of a Transport-Aircraft Configuration.
D. J. Weeks. Nov 76, 126p ARC-R/M-3842-PT-1, BR74033
Supersedes Rae-TR-76158; Arc-37486.

Measurements of forces and wing pressures at Mach numbers 0.70, 0.79 and 0.85, and at Reynolds numbers in the range 1.7 million to 13.6 million, on a half model of a transport-aircraft-type wing-body combination, were analyzed to show the effects of changes of Reynolds number and transition position on the transonic flows over the upper surface of the wing at high incidence. Each of the three Mach numbers provides a different example of flow development and form of scale effect.

N80-31365/3 PC **A06**/MF **A01**
Royal Aircraft Establishment, Farnborough (England). Aerodynamics Dept.
Jet Interference on Supercritical Wings. Part 1: Experiments on a Two-Dimensional Wing. Part 2: Experiments on a Swept Wing.
J. A. Bagley, and A. G. Kurn. Jan 77, 105p ARC-R/M-3845, BR74032
Supersedes Rae-TM-77007; Rae-TM-77008; Arc-37279; Arc-37281.

Wind tunnel tests were made to investigate the influence of the jet from several different nozzles on the pressure distribution on adjacent wing panels with supercritical profiles. An existing unswept wing panel was used for one test; a 25 deg swept wing panel was used for the other and additional measurements were made with pylons fitted to two of the nozzles. The nozzle shapes and their location relative to the wing were chosen to represent a modern airbus configuration with fan engines. The results indicate that, in the cruise configuration, the influence of the jet is fairly small, and in most cases it simply reinforces certain features of the pressure distribution measured without jet blowing.

N80-31366/1 PC **A03**/MF **A01**
Royal Aircraft Establishment, Bedford (England). Aerodynamics Dept.
Wind Tunnel Measurement of Lateral Aerodynamic Derivatives Using a New Oscillatory Rig, with Results and Comparisons for the Gnat Aircraft.
C. O. Oleary. Oct 77, 45p ARC-R/M-3847, BR74569
Supersedes Rae-TR-77159; Arc-37724.

The investigation of aircraft handling characteristics at high angle of attack and high subsonic speeds is hampered by the lack of accurate data on aerodynamic derivatives. The development of a rig and method of test for the measurement of oscillatory lateral aerodynamic derivatives under these conditions is described. Tests were made on a 0.16 scale model of a Gnat T Mk 1 aircraft and the results compared with those from wind tunnel static tests, flight tests and estimates. Agreement with the other data is reasonably close except in the case of some cross damping derivatives. The accuracy of measurement of derivatives due to rate of roll should be improved by a proposed design of the excitation system.

N80-31367/9 PC **A03**/MF **A01**
Royal Aircraft Establishment, Bedford (England). Aerodynamics Dept.
Measurements of Pressure Distributions and Pressure Drags at Zero Incidence on Both Blunt and Sharp Axisymmetric Forebodies at a Mach Number of 3.
L. C. Ward. Nov 76, 33p ARC-R/M-3849, BR74568
Supersedes Rae-TR-76160; Arc-37355.

Surface pressure distrubutions measured on a number of axisymmetric forebodies at zero incidence and a Mach number of 3 are presented. Integrated pressure drags are compared with the theoretical drags of sharp cones having the same forebody fineness ratios, showing that significant drag reductions can be achieved at this Mach number by the suitable use of nose blunting, leading also to an increase of usable volume in the forebody. Results are compared with published data for determining the pressure drag of spherically blunted cones.

N80-31368/7 PC **A02**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
A Brief Investigation of the Two-Dimensionality of the Flow over an Airfoil in the 8 Foot by 6 Foot Transonic Wind Tunnel.
P. H. Cook, and M. A. Mcdonald. Dec 79, 20p RAE-TM-AERO-1828, BR72384

Oil flow on the surface and pitot pressure measurements in the wake of a 0.762 m chord airfoil in a 8 ft x 6 ft tunnel indicate that there is no significant spanwise convergence or divergence of the flow within the boundary layer and wake of the model. The measurements were made at subsonic conditions where no regions of separated flow existed on the model, but where significant subsonic drag creep had previously been measured.

N80-31369/5 PC **A03**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Scientific Services Div.
A Numerical Method for the Calculation of Laminar Incompressible Boundary Layers with Strong Viscous-Inviscid Interaction.
A. E. P. Veldman. 7 Mar 79, 49p NLR-TR-79023-U

A method for the calculation of boundary layers with strong viscous inviscid interaction is presented. The method differs from the classical methods for solving boundary layer equation, through the use of an interactive boundary condition which replaces the usually prescribed pressure. This

boundary condition describes how the outer potential flow reacts on the presence of the boundary layer. The method is demonstrated on two problems: a boundary layer with a separation bubble and the flow near the trailing edge of a flat plate.

1B. Aeronautics

AD-A089 181/2 PC **A12**/MF **A01**
Battelle Columbus Labs OH
Evaluation of Safety Programs with Respect to the Causes of General Aviation Accidents. Volume II. Appendices,
T. M. Connor, and C. W. Hamilton. May 80, 262p FAA-ASP-80-2A
Contract DOT-FA78WA-4159
See also Volume 1, AD-A087 685.

Contents: Individual General Aviation Segment Data Summaries; Data Pertaining to the Business, Single- and Multi-Engine Piston Subpopulation; Data Pertaining to the Corporate, Single- and Multi-Engine Piston Subpopulation; Data Pertaining to the Personal, Single- and Multi-Engine Piston Subpopulation; Data Pertaining to the Aerial Application, Single - and Multi-Engine Piston Subpopulation; Data Pertaining to the Instructional, Single - and Multi-Engine Piston Subpopulation; Data Pertaining to the Air Taxi, Single - and Multi-Engine Piston Subpopulation; Data Pertaining to the Corporate, Turboprop and Turbojet Subpopulation; and Data Pertaining to the Rotor (All Categories) Subpopulation.

AD-A089 431/1 PC **A04**/MF **A01**
Federal Aviation Administration Technical Center Atlantic City NJ
Engineering and Development Program Plan Aircraft Crashworthiness,
Caesar A. Caiafa, and Lawrence M. Neri. Jun 80, 54p FAA-CT-80-166, FAA-ED-18-6

The Aircraft Crashworthiness Program Plan is designed to reduce or prevent aircraft occupants from incurring serious or fatal injuries in a 'survivable' crash impact accident by incorporating crashworthy design features into the initial stages of fixed-wing and rotary-wing aircraft development. It describes a 5-year development program for both airplanes and rotorcraft. It identifies five major subprogram areas for study and analysis to accomplish the program's goals: (1) Airframes; (2) Cabin safety; (3) Fuel system protection; (4) Emergency evacuation system; and (5) Standards, criteria, and procedures. The plan emphasizes use of available background data; development of analytical techniques; validation of analytical techniques; validation of data to determine feasibility/acceptability; and transmittal of appropriate data for consideration as the basis for regulation, standards, etc. The Federal Aviation Administration groups, other Government agencies/departments and industry organizations participating in this effort are identified. Program schedule with milestones is presented. Program management and funding requirements are also identified.

N80-31391/9 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Flight Div.
Helicopter-Ship Qualification Testing.
L. T. Renirie, and T. Hoekstra. 3 Jul 79, 16p NLR-MP-79027-U
Presented at 5TH European Rotorcraft and Powered Lift Aircraft Forum, Amsterdam, 4-7 Sep., 1979.

A test method was developed for establishing limits for helicopter takeoff and landing imposed by turbulence and flight deck motion. An onboard recorder monitors the helicopter engine parameters, collective pitch lever position, pedal position, radar altitude, vertical and lateral acceleration, and instant of takeoff and landing. Onboard ship, relative wind speed and direction, pitching and rolling angles, and vertical and lateral acceleration are recorded. To quantify the human factors in controlling the helicopter a pilot rating technique is applied. It was found that operational limits for the helicopter in terms of relative wind speed and direction can be established straightforwardly. With respect to ship motion, it was found satisfactory to use the 2 sigma value of motion parameters as a representative measure to define limits. Wind tunnel tests of ship models are described.

N80-31393/5 PC **A03**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
Maneuver Spectrum Fatigue Crack Propagation in Aluminum Alloy Sheet Materials.
R. J. H. Wanhill. 14 May 80, 34p NLR-TR-78091-U
Contract RNLAF-KLU-RE-1977.C14

Aluminum alloy sheets of 2024-T3, 2048-T851, 7075-T6 and 7475-T761, were compared for fatigue crack propagation resistance under maneuver spectrum and constant amplitude loading. For maneuver spectrum loading 7475-T761 was superior overall, probably due to toughness of this alloy. Alloy 2024-T3 was superior for lower stress levels and lower crack growth rates with maneuver spectrum loading and for lower delta K values with constant amplitude loading, while 7475-T761 was superior for higher crack growth rates and higher stress levels with maneuver spectrum loading and for higher delta K values with constant amplitude loading.

N80-31743/1 PC **A11**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Atmospheric Electricity-Aircraft Interaction.
May 80, 227p AGARD-LS-110, ISBN-92-835-1361-4
Lectures Held in London, 9-10 Jun. 1980, in Munich, 12-13 Jun. 1980, and in Menlo Park, Calif., 24-25 Jun. 1980.

No abstract available.

N80-32025/2 PC **A08**/MF **A01**
Tennessee Univ. Space Inst., Tullahoma. Scientific and Technical Information Branch.
Atmospheric Turbulence Simulation Techniques with Application to Flight Analysis.
Final Report.
S. T. Wang, and W. Frost. Sep 80, 171p NASA-CR-3309, M-302
Contract NAS8-32692

Statistical modeling of atmospheric turbulence is discussed. The statistical properties of atmospheric turbulence, in particular the probability distribution, the spectra, and the coherence are reviewed. Different atmospheric turbulence simulation models are investigated, and appropriate statistical analyses are carried out to verify their validity. The models for simulation are incorporated into a computer model of aircraft flight dynamics. Statistical results of computer simulated landings for an aircraft having characteristics of a DC-8 are reported for the different turbulence simulation techniques. The significance of various degrees of sophistication in the turbulence simulation techniques on the landing performance of the aircraft is discussed.

PB81-102071 PC **A02**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Technology.
General Aviation Accidents: Postcrash Fires and How to Prevent or Control Them.
Special study.
28 Aug 80, 21p NTSB-AAS-80-2

A study by the National Transportation Safety Board showed that postcrash fires occurred in approximately 8.0 percent of the 22,002 general aviation accidents during 1974-1978. About 59 percent of the accidents involving postcrash fire resulted in fatalities, while fatalities were involved in only 13.3 percent of those accidents without fire. A survey of state-of-the-art technology has demonstrated that feasible techniques for the containment of fuel exist. U.S. Army accident experience using similar technology has shown that fuel containment dramatically reduces fire injuries and deaths. The study has shown that there are few regulations dealing with the postcrash fire problem in general aviation aircraft. The Safety Board has made six recommendations to the Federal Aviation Administration for corrective action.

PB81-110827 PC **A14**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Technology.
Briefs of Fatal Accidents Involving Weather as a Cause/Factor, U.S. General Aviation, 1978.
5 Aug 80, 313p NTSB-AMM-80-5
See also report dated 19 Dec 78, PB-293 261.

The publication contains reports of all fatal U.S. general aviation accidents involving weather as a cause/factor for the year 1978. Included are 322 fatal accidents in the brief format. This format presents the facts, conditions, circumstances, and probable cause(s) for each accident. Additional statistical information is tabulated on all accidents involving weather as a cause/factor by type of accident, phase of operation, injury index, aircraft damage, pilots certificate, injuries and cause/factor(s). The publication is being published annually.

1C. Aircraft

AD-A089 240/6 PC **A15**/MF **A01**
McDonnell Aircraft Co St Louis MO
Aircraft Hydraulic Systems Dynamic Analysis. Volume VI. Steady State Flow Analysis (SSFAN) Computer Program Technical Description.
Final technical rept. Jun 78-Nov 79,
Ray Levek, and Bob Young. Apr 80, 344p AFAPL-TR-76-43-VOL-6
Contract F33615-74-C-2016
Supersedes Rept. no. AFAPL-TR-76-43-VOL-6, dated Feb 77, AD-A038 692. See also Volume 7, AD-A038 693.

SSFAN is a steady state hydraulic flow and pressure analysis computer program. Its primary purpose is to analyze non-linear resistance aircraft hydraulic systems. The program handles complex flow networks containing flow and/or pressure discontinuities such as unbalanced area actuators and check valves. Solutions for a combination of simultaneously operating subsystems are easily obtained. The program is designed using a building block approach so that new component or element models may be added with minimum change to the main program. The solution method is a Matrix type, using iteration to obtain a final flow and pressure balance. The program internally corrects viscosities for pressure, determines whether flow is laminar, transition or turbulent for use of appropriate resistance factors and corrects reservoir pressure for altitude effects. A Quasi-transient section has been added to allow multiple steady state calculations when simulating subsystem operations. The data is stored and can be printed in either tabular form or computer plot form. The program was written with the aircraft hydraulic system designer in mind. The terminology and units are commonly used terms such as fluid viscosity in centistokes, temperatures in degrees Fahrenheit and flow in gallons per minute. Conversion of units for calculation is accomplished internally in the program. (Author)

AD-A089 402/2 PC **A06**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Fatigue Testing of Vampire Wings,
R. A. Bruton, and C. A. Patching. Jun 79, 114p
Rept no. ARL/STRUC-378

The fatigue behaviour of a total of 21 port and starboard Vampire wings has been investigated for a 12 load level programmed loading sequence, representative of an average Australian flight loading spectrum. An additional two wings were subjected to a randomised sequence of these loads. This report describes the investigation and furnishes information on the following aspects: the fatigue life of major components in the wing; the ineffectiveness of replacing Parker-Kalon self tapping screws in the spar boom with pinned Chobert blind rivets; the increase in fatigue life achieved by replacing the lower spar boom; the residual strength of the cracked structure; the distribution of strain between screwed panels and the spar boom; and the fatigue resistance of glued wooden fuselages. (Author)

AD-A089 415/4 PC **A04**/MF **A01**
National Aviation Facilities Experimental Center Atlantic City NJ
Engineering and Development Program Plan, Aircraft Cabin Fire Safety.
Jun 80, 56p FAA-NA-80-159, FAA-ED-18-7

The Aircraft Cabin Fire Safety Program Plan is designed to improve the survivability of passengers and crew during an impact survivable postcrash transport aircraft cabin fire. Five major tasks are identified to accomplish the goal: (1) Postcrash Cabin Fire Hazard Characterization, (2) Laboratory Test Methodology Development, (3) Survival and Evacuation, (4) Fire Management and Suppression, and (5) Standards and Improvements. The program emphasizes the development of test methods and criteria for cabin interior materials that relate to flammability, smoke, and toxicity under postcrash fire conditions. Full-scale and model tests are performed initially to characterize the problem and identify governing parameters. A major activity is the correlation of small-scale and large-scale tests to determine what test or series of tests, test conditions, and data or scientific treatment of data best relate to postcrash cabin fire hazards. Quantification of the various hazards in terms of human survival will require studies to establish the escape impairment of irritant gases and develop a human survival model. Test method acceptability criteria will be derived based on a rational analysis incorporating computer models and cost/benefit computations. The program plan includes development or evaluation of cabin fire evacuation aids, including heat resistant evacuation slides, emergency lighting for a smoke-filled cabin environment and protective breathing devices, and fire management and suppression systems.

AD-A089 483/2 PC **A15**/MF **A01**
Naval Air Development Center Warminster PA Aircraft and Crew Systems Technology Directorate
Maritime Patrol Airship Study (MPAS).
Final rept.,
David B. Bailey, and Harold K. Rappoport. 19 Mar 80, 336p Rept no. NADC-80149-60
Contract MIPR-Z-70099-8-85

The Maritime Patrol Airship Study is an airship system applications study sponsored by the U.S. Navy and U.S. Coast Guard. Eight Major Cost Guard programs are analyzed for cost effective benefits of modern Lighter-Than-Air (LTA) vehicles. Representative script scenarios are developed for the eight programs based on actual Coast Guard mission experience. The scenarios are then used to size conceptual vehicles. In addition to in-house vehicle analysis, two independent efforts for comparative purposes based on the same scenarios were performed by contractor support.

AD-A089 492/3 MF **A01**
Naval Postgraduate School Monterey CA
Application of Powered High Lift Systems to STOL Aircraft Design.
Master's thesis,
Frederick Donald Ameel. Sep 79, 215p
Availability: Microfiche copies only.

The development of VTOL technology over a thirty year period was reviewed. Various powered-lift concepts were explored and recent application analyzed. The ACSYNT computer program, developed by the NASA Ames Research Center, was used to predict the takeoff performance of a proposed jet STOL transport utilizing the Lockheed AIBF system. A correlation of the performance of the S-3A VIKING aircraft was performed. (Author)

AD-A089 505/2 MF **A01**
Electronic Systems Div Hanscom AFB MA
Feasibility of Helicopter Support Seek Frost.
Study rept. Apr-Jun 79,
Robert L. Merna. May 80, 53p Rept no. ESD-TR-80-120
Availability: Microfiche copies only.

The purpose of this study is to assess the feasibility of supporting the Seek Frost unattended and minimally attended radar sites by helicopter. This paper reviews the navigation systems, facilities, ground support equipment and airborne installed equipment that would ensure a high reliability and capability of the Seek Frost Support Helicopter. Field trips were made to major civilian helicopter companies to incorporate their world wide experience in helicopter operations into the design concept. Present, in place, equipment along the Dew Line is not addressed.

AD-A089 525/0 PC **A03**/MF **A01**
Naval Postgraduate School Monterey CA
The Use of Parametric Cost Estimating Relationships as They Pertain to Aircraft Airframes; A New Perspective.
Master's thesis,
Bruce Robert Bennett. Mar 80, 47p

The purpose of this thesis was to review cost estimating relationships that have been developed and used for aircraft airframe costs, to identify existing problems, and where appropriate, to suggest alternatives for the future application of cost estimating relationships to aircraft airframes. Mahalanobis distance was explored as a means of complementing the more traditional statistical measures for regression analysis. This study supports the conclusion that cost estimating relationships should be developed for a specific system to be estimated, and that Mahalanobis distance is a potentially effective tool by which the analyst may address the important issue of analogy between the data base and the proposed system. (Author)

AD-A089 536/7 PC **A03**/MF **A01**
Lockheed-Georgia Co Marietta
Design Options Study. Volume I. Executive Summary.
Final rept.,
W. T. Mikolowsky, L. W. Noggle, H. J. Abbey, L. A. Adkins, and H. A. Bricker. Sep 80, 27p Rept no. LG80ER0006
Contract F33615-78-C-0122
See also Volume 2, AD-A089 537.

The Advanced Civil/Military Aircraft (ACMA) is envisioned as an advanced-technology cargo aircraft with the potential for fulfilling the needs of both military airlift and commercial air freight in the 1990s and beyond. The ultimate goal of the Design Options Study is the development of fundamental information regarding both the military and commercial cost and effectiveness implications of the most significant transport aircraft functional design features. This volume, the Executive Summary of the Design Options Study Final Report, presents an overview of the requirements of potential users of the ACMA and a brief summary of the results of the study. (Author)

AD-A089 537/5 PC **A09**/MF **A01**
Lockheed-Georgia Co Marietta
Design Options Study. Volume II. Approach and Summary Results.
Final rept.,
W. T. Mikolowsky, L. W. Noggle, H. J. Abbey, L. A. Adkins, and H. A. Bricker. Sep 80, 176p Rept no. LG80ER0007
Contract F33615-78-C-0122
See also Volume 1, AD-A089 536.

The Advanced Civil/Military Aircraft (ACMA) is envisioned as an advanced-technology cargo aircraft with the potential for fulfilling the needs of both military airlift and commercial air freight in the 1990s and beyond. The ultimate goal of the Design Options Study is the development of fundamental information regarding both the military and commercial cost and effectiveness implications of the most significant transport aircraft functional design features. This volume, the Approach and Summary Results of the Design Options Study Final Report, provides the background for the requirement for the ACMA; a description of the approach taken in this investigation of transport aircraft design options; a summary of the initial Qualitative Assessment used to reduce the scope of the study; and finally, a summary of the results of the detailed analyses. These results include estimates of the effects on aircraft geometry and efficiency, military effectiveness, and both civil and military costs, for incorporating in the ACMA each of the design options identified in the Qualitative Assessment. (Author)

AD-A089 538/3 PC **A09**/MF **A01**
Lockheed-Georgia Co Marietta
Design Options Study. Volume III. Qualitative Assessment.
Final rept.,
W. T. Mikolowsky, H. J. Abbey, L. A. Adkins, H. A. Bricker, and E. W. Caldwell. Sep 80, 181p Rept no. LG80ER0008
Contract F33615-78-C-0122
See also Volume 4, AD-A089 539.

The Advanced Civil/Military Aircraft (ACMA) is envisioned as an advanced-technology cargo aircraft with the potential for fulfilling the needs of both military airlift and commercial air freight in the 1990s and beyond. The ultimate goal of the Design Options Study is the development of fundamental information regarding both the military and commercial cost and effectiveness implications of the most significant transport aircraft functional design features. This volume, the Qualitative Assessment of the Design Options Study Final Report, qualitatively assesses all functional design features and associated options that have a potential impact on military/commercial commonality of the ACMA and recommends which should be subjected to more detailed analysis. Functional areas considered in the assessment include basic aircraft performance, ground interface, airfield compatibility, cargo compartment, inflight refueling, personnel accommodations, and military/civil design criteria. Based on this assessment, the following features are recommended for more detailed analysis: design payload, loading/unloading apertures, planform shape of cargo compartment, floor height, takeoff distance/gear flotation, noise characteristics/engine-out climb gradient, cargo-envelope maximum height, passenger provisions, maximum structural payload, service-life specification, cargo compartment pressurization, and cargo accommodation provisions. (Author)

AD-A089 539/1 PC **A10**/MF **A01**
Lockheed-Georgia Co Marietta
Design Options Study. Volume IV. Detailed Analyses Supporting Appendices.
Final rept.,
W. T. Mikolowsky, H. J. Abbey, L. A. Adkins, H. A. Bricker, and E. W. Caldwell. Sep 80, 204p Rept no. LG80ER0009
Contract F33615-78-C-0122
See also Volume 1, AD-A089 536.

The Advanced Civil/Military Aircraft (ACMA) is envisioned as an advanced-technology cargo aircraft with the potential for fulfilling the needs of both military airlift and commercial air freight in the 1990s and beyond. The ultimate goal of the Design Options Study is the development of fundamental information regarding both the military and commercial cost and effectiveness implications of the most significant transport aircraft functional design features. This volume, the Detailed Analyses Supporting Appendices of the Design Options Study Final Report, contains non-proprietary, detailed information and study methods used in the Study. This includes descriptions of the baseline aircraft that serve as the bases of the Qualitative Assessment; the computer-aided design methods used to assist in the redesign of aircraft incorporating each design option; and complete descriptions of each point design aircraft. (Author)

AD-A089 625/8 PC **A03**/MF **A01**
Army Aviation Engineering Flight Activity Edwards AFB CA
Preliminary Airworthiness Evaluation AH-1S Helicopter with OGEE Tip Shape Rotor Blades.
Final rept. Nov 79-Apr 80,
Gary L. Bender, Henry Arnaiz, David Ottomeyer, Ralph Woratschek, and Larry Higgins. May 80, 40p Rept no. USAAEFA-77-25

The United States Army Aviation Engineering Flight Activity conducted a Preliminary Airworthiness Evaluation of the AH-1S helicopter with OGEE tip-shape main rotor blades to determine if any improvement in performance or handling qualities resulted from replacing the K747 blades. Additionally, the acoustics signature of the OGEE blades were measured by the US Army Research and Technology Laboratories (Aeromechanics Lab). Tests were conducted at Edwards Air Force Base (elevation 2302 feet) and Coyote Flats (elevation 9980 feet), California from 1 November 1979 through 8 April 1980. Forty-five test flights were flown for a total of 36.6 productive hours

(63.2 total hours). Both hover and level flight performance were degraded by installation of OGEE tip-shape main rotor blades. Low-speed handling qualities were unaffected by the OGEE blades. Other handling qualities tests were not accomplished. Results of acoustics tests will be reported by the laboratories under a separate cover. (Author)

N80-31329/9 PC **A09**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
Aircraft Assessment and Acceptance Testing.
May 80, 195p AGARD-LS-108, ISBN-92-835-0266-3
Lecture Held in Gol, Norway, 5-6 Jun. 1980, in Athens, 9-10 Jun. 1980, and in Ankara, 12-13 Jun. 1980.

No abstract available.

N80-31350/5 PC **A08**/MF **A01**
De Havilland Aircraft Co. of Canada Ltd., Ottawa (Ontario).
Phase 2 and 3 Wind Tunnel Tests of the J-97 Powered, External Augmentor V/STOL Model.
D. B. Garland, and J. L. Harris. Mar 80, 174p NASA-CR-163578, DHC-DND-80-1
Contract NASW-2797

Static and forward speed tests were made in a 40 multiplied by 80 foot wind tunnel of a large-scale, ejector-powered V/STOL aircraft model. Modifications were made to the model following earlier tests primarily to improve longitudinal acceleration capability during transition from hovering to wing-borne flight. A rearward deflection of the fuselage augmentor thrust vector was shown to be beneficial in this regard. Other augmentor modifications were tested, notably the removal of both end-plates, which improved acceleration performance at the higher transition speeds. The model tests again demonstrated minimal interference of the fuselage augmentor on aerodynamic lift. A flapped canard surface also showed negligible influence on the performance of the wing and of the fuselage augmentor.

N80-31353/9 PC **A04**/MF **A01**
Razak (Kenneth), Wichita, KS.
Computation of Spanwise Distribution of Circulation and Lift Coefficient for Flapped Wings of Arbitrary Planform.
Final Report.
K. Razak. Aug 80, 61p NASA-CR-159329
Contract NAS1-15249

The question of the effect of distribution and magnitude of spanwise circulation and shed vorticity from an airplane wing on the distribution pattern of agricultural products distributed from an airplane was studied. The first step in an analysis of this question is the determination of the actual distribution of lift along an airplane wing, from which the pattern of shed vorticity can be determined. A procedure is developed to calculate the span loading for flapped and unflapped wings of arbitrary aspect ratio and taper ratio. The procedure was programmed on a small programmable calculator, the Hewlett Packard HP-97, and also was programmed in BASIC language. They could be used to explore the variations in span loading that can be secured by variable flap deflections or the effect of flying at varying air speeds at different airplane gross weights. Either an absolute evaluation of span loading can be secured or comparative span loading can be evaluated to determine their effect on swath width and swath distribution pattern. The programs are intended to assist the user in evaluating the effect of a given spanload distribution.

N80-31360/4 PC **A03**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Flight Div.
Ranges and Critical Values of Advance Ratio for Blade/Vortex Intersection Patterns of a Helicopter Rotor.
L. R. Lucassen. Jul 79, 31p NPL-MP-79030-U
Presented at 5TH European Rotorcraft and Powered Lift Aircraft Forum, Amsterdam, 5-7 Sep. 1979.

The free vortices trailing from the tip of helicopter rotor blades lead to large changes in induced velocity and local angle of attack, resulting in peaks in aerodynamic loading. For a single rotor in forward flight an analysis was performed on the geometry of blade/vortex intersection, while an undistorted, in-plane wake is assumed. This showed the existence of seven ranges of advance ratio, each range being characterized by a different blade/vortex intersection pattern. These ranges are separated by six critical advance ratios, which are functions only of the ratio between the number of rotor blades and the serial number index of the preceding blade or tip vortex. The lowest critical advance ratio is in agreement with data published on the position of a ripple in the power required curves for level flight, as measured for several helicopter types.

N80-31381/0 PC **A04**/MF **A01**
Northrop Corp., Hawthorne, CA. Aircraft Div.
Flow Visualization Study of the Himat Rprv.
D. J. Lorincz. Feb 80, 73p NASA-CR-163094, NOR-80-128
Contract NAS4-2616
Original Contains Color Illustrations.

Water tunnel studies were performed to qualitatively define the flow field of the highly maneuverable aircraft technology remotely piloted research vehicle (HiMAT RPRV). Particular emphasis was placed on defining the vortex flows generated at high angles of attack. The flow visualization tests were conducted in the Northrop water tunnel using a 1/15 scale model of the HiMAT RPRV. Flow visualization photographs were obtained for angles of attack up to 40 deg and sideslip angles up to 5 deg. The HiMAT model was investigated in detail to determine the canard and wing vortex flow field development, vortex paths, and vortex breakdown characteristics as a function of angle of attack and sideslip. The presence of the canard caused the wing vortex to form further outboard and delayed the breakdown of the wing vortex to higher angles of attack. An increase in leading edge camber of the maneuver configuration delayed both the formation and the breakdown of the wing and canard vortices. Additional tests showed that the canard vortex was sensitive to variations in inlet mass flow ratio and canard flap deflection angle.

N80-31382/8 PC **A05**/MF **A01**
Sikorsky Aircraft, Stratford, CT.
Bifilar Analysis Study, Volume 1.
W. Miao, and T. Mouzakis. Aug 80, 89p NASA-CR-159227, SER-510035-V-1
Contract NAS1-15612

A coupled rotor/bifilar/airframe analysis was developed and utilized to study the dynamic characteristics of the centrifugally tuned, rotor-hub-mounted, bifilar vibration absorber. The analysis contains the major components that impact the bifilar absorber performance, namely, an elastic rotor with hover aerodynamics, a flexible fuselage, and nonlinear individual degrees of freedom for each bifilar mass. Airspeed, rotor speed, bifilar mass and tuning variations are considered. The performance of the bifilar absorber is shown to be a function of its basic parameters: dynamic mass, damping and tuning, as well as the impedance of the rotor hub. The effect of the dissimilar responses of the individual bifilar masses which are caused by tolerance induced mass, damping and tuning variations is also examined.

N80-31383/6 PC **A16**/MF **A01**
Sikorsky Aircraft, Stratford, CT.
Bifilar Analysis Users Manual, Volume 2.
S. J. Cassarino. Aug 80, 366p NASA-CR-159228-V-2, SER-510036
Contract NAS1-15612

The digital computer program developed to study the vibration response of a coupled rotor/bifilar/airframe coupled system is described. The theoretical development of the rotor/airframe system equations of motion is provided. The fuselage and bifilar absorber equations of motion are discussed. The modular block approach used in the make-up of this computer program is described. The input data needed to run the rotor and bifilar absorber analyses is described. Sample output formats are presented and discussed. The results for four test cases, which use the major logic paths of the computer program, are presented. The overall program structure is discussed in detail. The FORTRAN subroutines are described in detail.

N80-31384/4 PC **A05**/MF **A01**
Lockheed-Georgia Co., Marietta.
Evaluation of Laminar Flow Control System Concepts for Subsonic Commercial Transport Aircraft.
Summary Report.
Sep 80, 100p NASA-CR-159254, LG80ER0149
Contract NAS1-14631

A study was conducted to evaluate alternatives in the design of laminar flow control (LFC) subsonic commercial transport aircraft for operation in the 1980's period. Analyses were conducted to select mission parameters and define optimum aircraft configurational parameters for the selected mission, defined by a passenger payload of 400 and a design range of 12,038 km (6500 n mi). The baseline aircraft developed for this mission was used as a vehicle for the evaluation and development of alternative LFC system concepts. Alternatives were evaluated in the areas of aerodynamics structures, materials, LFC systems, leading-edge region cleaning and integration of auxiliary systems. Based on these evaluations, concept in each area were selected for further development and testing and ultimate incorporation in the final study aircraft. Relative to a similarly-optimized advanced technology turbulent transport, the final LFC configuration is approximately equal in direct operating cost but provides decreases of 8.2% in gross weight and 21.7% in fuel consumption.

N80-31385/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Wing Profile Design of the World Championship Sail Plane SB 11.
K. H. Horstmann, and A. Quast. May 80, 9p NASA-TM-75829
Contract NASW-3198
Transl. Into English from Dfvlr-Nachr. (Germany, F.R.), Nov. 1979 p 19-20. Original Language Document Announced as A80-13181. Transl. By Scientific Translation Service, Santa Barbara, Calif.

A glider capable of climbing while circling in an updraft at low speed with a great mount of lift while gliding to the next updraft at high speed and with minimal altitude loss was designed. The wing profile design alleviates several problems and leaves no gap between wind and flap. A constant thickness flap eliminates the need for a flexible contour section which in turn reduces control effort. The conventional method of banking with ailerons is retained. Improved performance is demonstrated.

N80-31386/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Comparison of Calculated and Measured Blade Loads on a Full-Scale Tilting Proprotor in a Wind Tunnel.
W. Johnson. Sep 80, 22p NASA-TM-81228, USAAVRADCOM-TR-80-A-8
Prepared in Cooperation with Army Aviation Research and Development Command, St. Louis, Mo.

The loads measured in a wind tunnel on a full-scale tilting proprotor are compared with calculated results. The data consists primarily of oscillatory beamwise bending moments at 35% radial station, oscillatory spindle chord bending moments, and oscillatory pitch link loads. The measured and calculated results as a function of thrust are compared over a range of nacelle angles from 0 to 75 deg, and a range of speeds from 80 to 185 knots.

N80-31392/7 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
Significance of a Rotor Blade Failure for Fleet Operation, Inspection, Maintenance, Design and Certification.
R. J. H. Wanhill, E. A. B. Degraaf, and A. A. M. Delil. Sep 79, 16p NLR-MP-79021-U
Presented at 5TH European Rotorcraft and Powered Lift Aircraft Forum, Amsterdam, 4-7 Sep. 1979.

The catastrophic fracture of a rotor blade from a large helicopter was analyzed, with essentially immediate consequences for continued fleet operation, inspection and maintenance of the same

type of rotor blade. Fractography indicated that the hollow blade spar had failed by fatigue originating from one or two corrosion pits under the spar/pocket joint. The service failure investigation was reviewed to serve as an essential illustration for subsequent discussion of remedial action for similar types of rotor blades, and design aspects, philosophy and procedure. This includes the adhesive bonding system, the pressurizing gas crack detection system, rotor blade working stresses, and estimation of fatigue initiative and crack growth lives.

N80-31395/0 PC **A02**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
A Study of the Use of Blocking Masses in Reducing Helicopter Cabin Noise.
C. H. Ellen. Mar 80, 23p RAE-TM-AERO-1838, BR73588

A brief theoretical examination of the use of blocking masses for application to helicopter structure is presented. The effects of a periodic array of blocking masses are compared with the effect of a single blocking mass for a bending wave on a plate. The significance of the modal structure is demonstrated, and the analysis of the excitation of a membrane strip at a point between two blocking masses is used to illustrate how the energy flow varies with frequency of excitation.

N80-31401/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
The NASA High-Speed Turboprop Program.
J. F. Dugan, B. A. Miller, E. J. Graber, and D. A. Sagerser. 1980, 48p NASA-TM-81561, E-452
Presented at the Aerospace Congr., Los Angeles, 13-16 Oct. 1980; Sponsored by the AM. Soc. Of Automotive Engr.

Technology readiness for Mach 0.7 to 0.8 turboprop powered aircraft with the potential for fuel savings and DOC reductions of up to 30 and 15 percent respectively relative to current in-service aircraft is addressed. The areas of propeller aeroacoustics, propeller structures, turboprop installed performance, aircraft cabin environment, and turboprop engine and aircraft studies are emphasized. Large scale propeller characteristics and high speed propeller flight research tests using a modified testbed aircraft are also considered.

N80-31407/3 PC **A05**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Effects of Rotor Parameter Variations on Handling Qualities of Unaugmented Helicopters in Simulated Terrain Flight.
P. D. Talbot, D. D. Dugan, R. T. N. Chen, and R. M. Gerdes. Aug 80, 88p NASA-TM-81190, A-8158

A coordinated analysis and ground simulator experiment was performed to investigate the effects on single rotor helicopter handling qualities of systematic variations in the main rotor hinge restraint, hub hinge offset, pitch-flap coupling, and blade lock number. Teetering rotor, articulated rotor, and hingeless rotor helicopters were evaluated by research pilots in special low level flying tasks involving obstacle avoidance at 60 to 100 knots airspeed. The results of the experiment are in the form of pilot ratings, pilot commentary, and some objective performance measures. Criteria for damping and sensitivity are reexamined when combined with the additional factors of cross coupling due to pitch and roll rates, pitch coupling with collective pitch, and longitudinal static stability. Ratings obtained with and without motion are compared. Acceptable flying qualities were obtained within each rotor type by suitable adjustment of the hub parameters, however, pure teetering rotors were found to lack control power for the tasks. A limit for the coupling parameter L sub q/L sub p of 0.35 is suggested.

N80-31807/4 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
Reassessment of Service Life by Comparative Specimen Tests.
J. B. Dejonge. 23 Feb 79, 20p NLR-MP-79008-U
Sponsored by Netherlands Research Branch of the Directorate of Materials Air. Presented at 10TH Icaf Symp., Brussels, 16-18 May, 1979.

Various aspects of aircraft service life reassessment are discussed in light of the fact that the actual load experience of aircraft may deviate appreciably from design assumptions. Life assessment procedures using comparative fatigue tests on speciments are described for the F-5 aircraft used by the Royal Netherlands Air Force specimens were developed representing critical areas using the same material and heat treatment, same grain direction, surface treatment, and same bolt type.

N80-31820/7 PC **A04**/MF **A01**
Lockheed-Georgia Co., Marietta.
Design and Analysis of a Stiffened Composite Fuselage Panel.
J. N. Dickson, and S. B. Biggers. Aug 80, 51p NASA-CR-159302, LG80ER0137
Contract NAS1-15949

The design and analysis of stiffened composite panel that is representative of the fuselage structure of existing wide bodied aircraft is discussed. The panel is a minimum weight design, based on the current level of technology and realistic loads and criteria. Several different stiffener configurations were investigated in the optimization process. The final configuration is an all graphite/epoxy J-stiffened design in which the skin between adjacent stiffeners is permitted to buckle under design loads. Fail safe concepts typically employed in metallic fuselage structure have been incorporated in the design. A conservative approach has been used with regard to structural details such as skin/frame and stringer/frame attachments and other areas where sufficient design data was not available.

N80-32145/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Overview of Integrated Programs for Aerospace-Vehicle Design (IPAD).
R. E. Fulton. Sep 80, 23p NASA-TM-81874, L-14022
Presented at Ipad Natl. Symp., Denver, 17-19 Sep. 1980.

An overview of a joint industry/government project, denoted Integrated Programs for Aerospace-Vehicle Design (IPAD), which focuses on development of technology and associated software for integrated company-wide management of engineering information is presented. Results to date are summarized and include an in-depth documentation of a representative design process for a large engineering project, the definition and design of computer-aided design software needed to support that process, and the release of prototype software to integrated selected design functions.

PATENT-4 212 441 Not available NTIS
Department of the Air Force Washington DC
Wing Pivot Assembly for Variable Sweep Wing Aircraft.
Patent,
Leonard A. Ascani, Jr., Burton C. Rickey, Merle E. Riggs, and Andrew R. Shoemaker. Filed 11 May 78, patented 15 Jul 80, 9p AD-D007 435/1, PAT-APPL-905 063
Supersedes PAT-APPL-905 063-78, AD-D005 089.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a wing pivot assembly for variable sweep wing aircraft for moveably securing a wing of the aircraft to the fuselage. The wing pivot assembly has a pivot pin supported by a pair of inboard lugs secured to the fuselage of the aircraft. The wing is, in turn, moveably secured to the pivot pin by bearings interposed between the pivot pin and a pair of outboard lugs. In addition an outboard shear fitting located between the wing and the pivot pin moveably supports the wing and transfers shear loads to the pivot pin. An inboard shear fitting and anti-rotation device secures and transfers shear loads between the pivot pin and the fuselage. As a result of the above arrangement a multi-load path structure provides for a fail-safe pivot assembly.

PB81-108177 PC **E03**/MF **A01**
National Oceanic and Atmospheric Administration, Silver Spring, MD. Air Resources Labs.
The TRAPS Sonic Boom Program.
Technical memo.,
Albion D. Taylor. Jul 80, 62p NOAA-TM-ERL-ARL-87, NOAA-80090903
Includes one sheet of 48X reduction microfiche.

A new program called TRAPS has been written having the capability of modelling an aircraft-created sonic boom. Like an earlier program (ARAP), this program allows the aircraft to perform an arbitrary sequence of maneuvers, accelerations and deaccelerations, and it uses a stratified atmospheric model of either a standard or user-specified composition. The new program introduces the new feature of accounting for sonic booms which travel upward initially, but are subsequently refracted from the stratopause (approx. 50,000 meters) or the thermosphere (approx. 100,000 meters). Overpressures and shocks are computed from an initial aircraft F-function on the basis of Aging and Hilbert Transforms applied according to the travel paths (rays) of the acoustic energy. In addition, input procedures are simplified and information is made available as to what proportion of the aircraft sonic boom can intercept the ground.

1D. Aircraft Flight Control and Instrumentation

AD-A089 378/4 PC **A02**/MF **A01**
Aircraft Research and Development Unit Edinburgh (Australia)
Fitment of 'TAMAM' Standby Attitude Indicators to Macchi Aircraft.
Engineering rept.,
D. K. King. Aug 80, 16p Rept no. TI-683

The Aircraft Research and Development Unit reworked Macchi MB 326H Draft Modification Order No 365 to install the 'TAMAM' Standby Attitude Indicator (SAI) in the front and rear instrument panels of Macchi aircraft. Modifications were also developed to provide independent switching and circuit protection for each SAI on the existing FIRE/OVERHEAT panel in the Right hand console of the front cockpit. RPM indicator lighting control was transferred from its individual rheostat to the panel lighting control and protection circuit. The modification was successfully test flown with particular emphasis on instrument readability, lack of conflict with the flight controls and ease of operation. Residual errors noted in the SAIs after manoeuvres were large but were immediately cancelled by operation of the caging knob. Trial flying of the installation showed the modification to be operationally acceptable and fleet wide installation was recommended.

N80-31375/2 PC **A06**/MF **A01**
Lockheed Aircraft Corp., Burbank, CA.
Development of Advanced Avionics Systems Applicable to Terminal-Configured Vehicles.
Final Report, Oct. 1978 - Jan. 1980.
R. L. Heimbold, H. P. Lee, and M. F. Leffler. Sep 80, 105p NASA-CR-3280, LR-29326
Contract NAS1-15546

A technique to add the time constraint to the automatic descent feature of the existing L-1011 aircraft Flight Management System (FMS) was developed. Software modifications were incorporated in the FMS computer program and the results checked by lab simulation and on a series of eleven test flights. An arrival time dispersion (2 sigma) of 19 seconds was achieved. The 4 D descent technique can be integrated with the time-based metering method of air traffic control. Substantial reductions in delays at today's busy airports should result.

N80-31397/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

Perception of Aircraft Separation with Pilot-Preferred Symbology on a Cockpit Display of Traffic Information.
S. Oconnor, S. Jago, D. Baty, and E. Palmer.
Sep 80, 16p NASA-TM-81172, A-8107
Grant NSG-2269

The concept of a cockpit display of traffic information (CDTI) was developed for use in later full mission simulator evaluations of the CDTI concept. Pilots chose their preferred method of displaying air traffic information for several variables. Variables included: type of background, update rate, update type, predictor type, and history type. Each pilot designed a display he felt would be most useful in flight operations. After a series of test trials, each pilot was given the opportunity to modify the display for the experimental task. For a second day of testing, they repeated the experimental task using their display as well as displays chosen by other pilots. Results indicated a variety of individual preferences in symbology and differences in the accuracy of judgments. Pilots indicated concern for clutter of the display, relationship of the displayed symbology to physical reality, and a need to perceive the relative motion of the intruder aircraft. Analysis of data indicated that pilots were able to improve their performance with practice.

1E. Air Facilities

AD-A089 266/1 PC **A04**/MF **A01**
Civil Engineering Lab (Navy) Port Hueneme CA
Fiberglass-Reinforced Rigid Polyurethane Expedient Pavement Subject to Simulated F-4 Aircraft Traffic.
Technical note,
P. S. Springston. May 80, 64p Rept no. CEL-TN-1578

A multipurpose expedient paving system is being developed to enable more rapid construction of expeditionary airfields by Marine Corps forces engaged in an amphibious landing. Previous research has resulted in a conceptual pavement, FIBERMAT, which consists of a facing of fiberglass-reinforced polyester resin (FRP) bonded to a core of fiberglass-reinforced rigid polyurethane foam. FIBERMAT has been subjected to a series of laboratory tests to define response to stress fatigue and environmental cycling. A similar structural sandwich of FRP and rigid polyurethane foam has been tested and found to meet F-4 aircraft static load, tailhook impact, and engine exhaust blast requirements. This report documents the results of a traffic test conducted on a section of FIBERMAT having a 5-inch-thick fiberglass-reinforced foam core and a 1/4-inch-thick FRP facing. Distributed traffic was applied to the test section with a load cart which simulated a main gear of an F-4 aircraft. The cart was equipped with a 30-7.7, 18-ply-rating tire inflated to 265 psi and loaded to 27,000 pounds. The first failure within the test section was recorded at 136 coverages (1,306 passes) of the load cart, and the entire test section was considered failed at 310 coverages (2,141 passes). (Author)

AD-A089 437/8 PC **A09**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Geotechnical Lab
Procedure for Condition Survey of Civil Airports.
Final rept. Jan 78-Sep 79,
Jim W. Hall, Jr., and Darrell R. Elsea. May 80, 186p FAA-RD-80-55
Contract DOT-FA78WAI-846

With an increase in air traffic and relatively limited new airport pavement construction, a major effort is being devoted to strengthening, rehabilitating, and maintaining existing pavements with emphasis on improved safety and increased capacity. This study was undertaken to provide airport pavement engineers with techniques for assessing the present condition of an airport pavement, for making comparisons of design predictions to actual performance, and for making predictions as to the remaining life of a pavement. A review of existing techniques for surface condition evaluation was made, and the best features of each procedure were extracted for the development of the proposed FAA procedure. The basis of this procedure is taken from work done by the U. S. Army Construction Engineering Research Laboratory (CERL), and the condition rating procedure developed by CERL for the Air Force was rated as the most comprehensive method reviewed and was selected as the method with the most potential for use on civil airports. Appendix A presents the condition survey procedure, and Appendix B presents an airport pavement distress identification manual. (Author)

AD-A089 450/1 PC **A08**/MF **A01**
Federal Aviation Administration Washington DC Office of Aviation Policy
Hourly Airport Activity Profiles: 30 Airports by User, 3 Airports by User and Equipment Type, Selected Days in June, July, and August 1978.
1980, 156p Rept no. FAA-AVP-80-7

The first section of this report contains statistics on aircraft operations, by user category for 30 airports for selected days in June, July and August 1978. Using the series of tables and graphs on Atlanta as an example, the data should be interpreted as described in the following paragraphs. First, note that the data used for generating the statistics in the table included all operations occurring in Atlanta during August 1978. Local time in this case would be equivalent to eastern daylight time. Aircraft operations occurring between midnight and 1:00 a.m. are counted in time slot zero. Similarly, activity occurring between 12:00 noon and 1:00 p.m. is assigned to time slot 12:00. The second part of this report consists of six tables and seven graphs which portray total daily aircraft departures and average hourly aircraft departures by equipment type for three cities: Kansas City, Missouri; Omaha, Nebraska; and St. Louis, Missouri. This part of the report may be regarded as exploratory in nature. The tables and graphs provide, for the first time, information on departures by equipment type, by hour of the day. Previously, such information was available for air carrier operations at the top 100 air carrier airports. The information in this section includes operations by all user categories.

2. AGRICULTURE

2B. Agricultural Economics

PB81-105660 PC **A05**/MF **A01**
Economics and Statistics Service, Washington, DC. National Economics Div.
Part-Time and Small Farming: An Annotated Bibliography.
Staff rept.,
Lenora Bohren. Oct 80, 90p AGESS-801002.1

While the majority of works cited in this annotated bibliography pertain to part-time farming in the United States, the collection includes references to other countries as well, especially European and South American. The works are presented alphabetically by author and describe the nature and prevalence of part-time farming, the reasons for it, its finances, its effect on the farm sector, the enterprises best suited for part-time farming, etc. A geographic index at the back of the collection guides the reader to entries that deal only with a certain country, State, province, or region.

2C. Agricultural Engineering

PAT-APPL-6-130 634 PC **A03**/MF **A01**
Department of Agriculture, Washington, DC.
Machine for Planting Containerized Tree and Shrub Seedlings.
Patent Application,
Walter Moden, Jr., Teddy L. Pickett, Isidro D. Ignacio, and Marco Rojas. Filed 14 Mar 80, 31p PB81-101628
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to mechanical planters, and more particularly to an improved automated machine for planting nursery stock such as tree and shrub seedlings. This is especially suited for planting such seedlings on slopes and irregular terrain and performs the required steps automatically without requiring human intervention.

PAT-APPL-6-132 591 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Steep Slope Seeding Machine.
Patent Application,
Teddy Lee Pickett, Isidro Dila Ignacio, and Marco Rojas. Filed 21 Mar 80, 24p PB81-101610
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to agricultural equipment, and more particularly to a machine for seeding relatively steep slopes, such as for reseeding steep roadside slopes which have been denuded during road construction.

PB81-107112 PC **A04**/MF **A01**
Ohio Farm Bureau Development Corp., Columbus.
Information Programs Affect Attitudes Toward Sewage Sludge Use in Agriculture.
Final rept.,
Ned M. Musselman, Lawrence G. Welling, Sandy C. Newman, and David A. Sharp. Jul 80, 62p EPA-600/2-80-103
Grant EPA-R-804703

A survey was conducted of rural farmers, rural nonfarmers, urban and suburban residents to determine attitudes toward land application of sludge. After a thorough educational meeting devoted to a discussion of benefits and risks in sludge use, the groups were again quizzed and the answers compared to assess the effectiveness of the educational program. It was found that farmers who had used sludge, or were acquainted with its use, were more amenable to its use than those with no prior experience with it.

PB81-112674 PC **A13**/MF **A01**
Texas Water Resources Inst., College Station.
Impact of Alternative Energy Prices, Tenure Arrangements and Irrigation Technologies on a Typical Texas High Plains Farm.
Technical rept.,
James A. Petty, Ronald D. Lacewell, Daniel C. Hardin, and Robert E. Whitson. May 80, 285p TR-106, W81-00032, OWRT-A-045-TEX(1)
Contracts DI-14-34-0001-9046, DI-14-34-0001-0146

Irrigation is a major contributing factor in crop production on the Texas High Plains. A recursive linear Programming model for a typical Texas High Plains irrigated farm was developed to evaluate expected impact of price changes, tenure and new technology. Model results indicate that irrigated would be terminated when the price of natural gas reached about $7.00 per mcf. Annual returns (above variable and fixed costs) were reduced by about as much as 30 percent, and the present value of returns to water was reduced by as much as 80 percent as the natural gas price was increased annually by $0.25 per mcf (from $1.50 per mcf). The economic life of deep groundwater was shortened by as much as 18 years. Renter-operators are even more vulnerable to rising natural gas prices than are owner-operators. Substantial economic gains appear feasible through improved pump efficiency. Results indicate that irrigation can be extended by 11 or more years with 50 percent improved distribution efficiency.

2D. Agronomy and Horticulture

PAT-APPL-6-052 656 PC **A03**/MF **A01**
Department of Agriculture, Washington, DC.
Improved Tree Rooting Using Synthetic Auxins.
Patent Application,
Bruce E. Haissig, Jack R. Gaines, and Glen M. Giacoletto. Filed 27 Jun 79, 31p PB81-107872
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention relates to the use of synthetic auxins to initiate adventitious root formation.

PB81-104903 PC **A05**/MF **A01**
Maine Univ. at Orono. Land and Water Resources Center.
Evapotranspiration from Vegetative Surfaces in Maine.
Technical bulletin,
Stewart M. Goltz. Jun 80, 80p TB-97, W80,-06707, OWRT-A-035-ME(1)
Prepared in cooperation with Maine Univ. at Orono. Dept. of Plant and Soil Sciences.

Diurnal evapotranspiration (ET) measurements were made for lowbush blueberries and potatoes in Maine during selected portions of the 1977 and 1978 growing seasons. Half-hourly measurements were made using a Bowen ratio-energy budget method. These data provided the principal energy budget components, and evaluation of potential ET, and a variety of diagnostics used to evaluate the partitioning of available energy into sensible/latent heat. The Priestly and Taylor equilibrium evaporation equation was examined to attempt a reliable daily estimate of ET from potatoes using a minimum amount of the data. This equation was modified, to incorporating a soil moisture tension term to account for drying soil conditions, to predict daily ET rates. Reliable ET rates are essential to hydrologic planning, for evaluation of waste disposal methods, and for enhancing agricultural productivity.

PB81-111254 PC **A03**/MF **A01**
New Hampshire Univ., Durham. Water Resources Research Center.
Frequency of Agricultural and Forest Drought in New Hampshire: 1926-1975,
C. Anthony Federer. Mar 80, 45p RR-26, W81-00034, OWRT-A-999-NH(6)
Prepared in cooperation with Northeastern Forest Experiment Station, Broomall, PA.

Agricultural drought is defined as a shortage of soil water for plant growth. It can be quantified in terms of soil-water deficits during the growing season. A hydrologic simulation model called BROOK was used to estimate daily soil-water deficits from daily precipitation and mean temperature for 50 years (1926-1975) at three New Hampshire locations: Berlin, Durham, and Keene. In the simulated soil, which had about 120 mm of available water, deficits greater than 60 mm may indicate occurrence of agricultural drought. This deficit is exceeded about half the time between mid-July and mid-September at all locations.

2F. Forestry

PB81-104531 PC **A05**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Abstracts of Urban Forestry Research in Progress - 1979.
General technical rept. (Final),
Rowan A. Rowntree, and Judith L. Wolfe. Sep 80, 80p NEFES-80-114, FSGTR-NE-60
Prepared in cooperation with State Univ. of New York Coll. of Environmental Science and Forestry, Syracuse.

The report is a summary of research in progress on urban forestry. Abstracts inform researchers of ongoing work and help urban forest managers anticipate results of interest to them.

PB81-111486 PC **A07**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Trees for Reclamation.
General technical rept. (Final).
1980, 129p NEFES/81-116, FSGTR-NE-61
Proceedings of a Symposium held at Lexington, Kentucky on October 27-29, 1980. Sponsored in part by Interstate Mining Compact Commission.

A collection of 30 papers was presented at the symposium on trees for reclamation in the Eastern United States held October 27-29, 1980, Lexington, Kentucky, and sponsored by the USDA Forest Service and Interstate Mining Compact Commission.

PB81-111676 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Guide to the Measurement of Tree Characteristics Important to the Quality Classification System for Young Hardwood Trees.
General technical rept. (Final),
David L. Sonderman. 1979, 16p FSGTR-NE-54, NEFES/81-122

The report describes a procedure for measuring external tree characteristics that are important in determining the current and future quality of young hardwood trees.

3. ASTRONOMY AND ASTROPHYSICS

3A. Astronomy

N80-32303/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Documentation for the Machine-Readable Version of the Catalog of Supplemental Stars to the Bonner Durchmusterung.
W. H. Warren, Jr. May 80, 12p NASA-TM-81119, NSSDC/WDC-A-R/S-80-01

The magnetic tape version of the Bonn catalog is described. The catalog contains a listing of supplemental stars having lower case letter designations following the BD numbers after which they have been inserted. A sample catalog is also presented.

N80-32304/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Documentation for the Machine-Readable Version of the Perth 70: A Catalogue of Positions of 24900 Stars Tape B, Mean Values of the Observation.
W. H. Warren, Jr. Jul 80, 11p NASA-TM-80849, NSSDC/WDC-A-R/S-80-04

The Perth 70 catalog contains accurate positions of 24978 stars, plus other useful data such as approximate proper motions, radial velocities, and parallaxes. The Perth 70 is a result of meridian circle observations made by the Hamburg observatory expedition to Perth as part of the international effort of Southern References Stars (SRS). Tape B, which contains mean values of the observations and corresponds to the printed catalog is described.

N80-32305/8 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Astronomical Data Center Bulletin, Volume 1, No. 1.
W. H. Warren, Jr., T. A. Nagy, and J. M. Mead. Jul 80, 54p NASA-TM-80764, NSSDC/WDC-A-R/S-80-07-V-1

Information about work in progress on astronomical catalogs is presented. In addition to progress reports, an upadated status list for astronomical catalogs available at the Astronomical Data Center is included. Papers from observatories and individuals involved with astronomical data are also presented.

3B. Astrophysics

AD-A089 473/3 PC **A02**/MF **A01**
Louisiana State Univ Baton Rouge Observatory
Spectral Classification for Landolt's Celestial Equatorial Standard Stars,
John S. Drilling, and Arlo U. Landolt. 29 Jan 79, 5p CONTRIB-145, AFOSR-TR-80-0763
Grants AFOSR-77-3218, NSF-AST74-04128
Pub. in The Astronomical Jnl., v84 n6 p783-786 Jun 79.

No abstract available.

N80-32208/4 PC **A05**/MF **A01**
Visidyne, Inc., Burlington, MA.
Pinhole X-Ray/Coronagraph Optical Systems Concept Definition Study.
Final Report.
T. F. Zehnpfenning, S. A. Rappaport, and R. B. Wattson. 12 Sep 80, 81p NASA-CR-161567, VI-556
Contract NAS8-33697

The Pinhole X-ray/Coronagraph Concept utilizes the long baselines possible in Earth orbit with the space transportation system (shuttle) to produce observations of solar X-ray emission features at extremely high spatial resolution (up to 0.1 arc second) and high energy (up to 100 keV), and also white light and UV observations of the inner and outer corona at high spatial and/or spectral resolution. An examination of various aspects of a preliminary version of the X-ray Pinhole/Coronagraph Concept is presented. For this preliminary version, the instrument package will be carried in the shuttle bay on a mounting platform, and will be connected to the occulter with a deployable boom such as an Astromast. Generally, the spatial resolution, stray light levels, and minimum limb observing angles improve as the boom length increases. However, the associated engineering problems also become more serious with greater boom lengths.

N80-32306/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Blackbody Curves for the IUE Spectral Range lambda 1150 to Lamda 3200 from 6,000 to 200,000 K.
W. A. Feibelman. Aug 80, 44p NASA-TM-81997

Two sets of blackbody curves are presented for the wavelength region covering the international ultraviolet explorer spectrographs. One set is normalized to unity at 3200 A, the other is normalized at 1900 A for those astronomers primarily interested in data for the SWP range. The blackbody curves extend from 1150 to 3200 A and cover the temperature range from 6,000 to 200,000K.

N80-32309/0 PC **A02**/MF **A01**
Smithsonian Astrophysical Observatory, Cambridge, MA.
Mineralogic and Petrologic Studies of Lunar Samples and Meteorites.
Final Report, 1 Feb. 1979 - 31 Aug. 1980.
J. A. Wood. 31 Aug 80, 17p NASA-CR-163498
Grant NSG-7596

Experimental and thermodynamic research on the pressure temperature limits of the stability of the mineral assemblages found in pristine, spinel bearing lunar highland lithologies demonstrated the likelihood that the minerals originated in the lower stratigraphic levels of the primordial crust. The

phase equilibrium in silicate solid/liquid systems of planetary importance were thermochemically interpreted in order to model the early formation of the crusts and maneles of Earth and Moon sized planets. The petrography and chemical composition of coarse grained gabbro, the chemical analysis and age dating of clasts from Apollo 16 breccia, the analysis of glass particles from Apollo 16 soil samples, the study of Allende and Mokoia meteorites as a source of information about events in the solar nebula, and the hydrothermal alteration of amorphous materials were also investigated. The capabilities of a model for addressing the problem of the origin of the Earth's moon by the disruptive capture mechanism are examined as well as models of the thermal evolution of hypothetical meteorite bodies. Progress in determining the composition of stony meteorite specimens collected at the Allan Hills site during the Antarctic field exploration is reported.

N80-32310/8 PC **A05**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
The International Halley Watch.
Jul 80, 80p NASA-TM-82181

In preparation for the 1985 to 1986 apparition of Halley's Comet, the International Halley Watch (IHW) has initiated a comprehensive program to simulate, encourage, and coordinate scientific observation of the apparition. The observing groups with which the IHW plans to interact are discussed and the ground based observing nets are described in detail. An outline of the history of observations of Halley's Comet and a synopsis of comet properties and physics are included.

N80-32311/6 PC **A05**/MF **A01**
Air Force Systems Command, Wright-Patterson AFB, OH.
The Mosaics of Mars: As Seen by the Viking Lander Cameras.
Final Report.
E. C. Levinthal, and K. L. Jones. Sep 80, 79p NASA-CR-3326
Grant NSG-7538

The mosaics and derivative products produced from many individual high resolution images acquired by the Viking Lander Camera Systems are described: A morning and afternoon mosaic for both cameras at the Lander 1 Chryse Planitia site, and a morning, noon, and afternoon camera pair at Utopia Planitia, the Lander 11 site. The derived products include special geometric projections of the mosaic data sets, polar stereographic (donut), stereoscopic, and orthographic. Contour maps and vertical profiles of the topography were overlaid on the mosaics from which they were derived. Sets of stereo pairs were extracted and enlarged from stereoscopic projections of the mosaics.

N80-32314/0 PC **A05**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Longitudinal and Transverse Magnetic Field Program Procedure and Detailed Specification for sigma 5.
C. K. Wang. Aug 80, 91p NASA-TM-78292

A computer program and procedure for plotting the contour of the data transferred from the Marshall Space Flight Center solar magnetography is presented. The plotted data then can be easily compared with solar data from other sources, such as the Solar Maximum Mission. From the data file for circular polarization the longitudinal program plots the contours for filtered longitudinal plot and intensity plot by choosing the positive and negative contour levels, intensity levels, and also X,Y plotting ranges which need to be used. In a similar manner the transverse program generates the transverse contour plot, azimuth plot, and intensity plot from the linear polarization data files.

N80-32315/7 PC **A02**/MF **A01**
Weber State Coll., Ogden, UT. Dept. of Physics.
Spectrum Synthesis of EUV Solar Flare Line Profiles.
Final Report.
D. A. Tripp. Jul 80, 18p NASA-CR-161551
Contract NAS8-33113

A classic double ribbon flare of importance 1B occurred at approximately 1405 UT on June 15, 1973, reached an H alpha maximum at 1413 UT, and ended at 1455 UT. The flare occurred in an old and simplifying bipolar region at N18 W32. This flare was studied due to the extensive temporal data available. A total of 136 spectra of wavelength ranges from 1100 to 3000 A were taken during the flare's duration by the Naval Research Laboratory normal incidence slit spectrograph. Using this data the nature of the solar chromosphere of a flare event as a function of time was determined.

N80-32316/5 PC **A06**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
The Helios Solar Probes Science Summaries.
Progress Report, 1974 - 1979.
J. H. Trainor. Aug 80, 106p NASA-TM-82005

The principal results of the Helios investigations through the first five years of the missions are presented.

N80-32320/7 PC **A02**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA. Space Sciences Dept.
Data Reduction and Analysis for the TRW IMP-7 Plasma Wave Experiment.
Final Report.
F. L. Scarf. 31 Oct 79, 5p NASA-CR-160011, REPT-22751-6011-RU-00
Contract NAS5-23150

Highlights from the IMP 7 plasma wave experiment are briefly outlined. The measurements in the tail revealed great complexities involving substorms and fireballs and provided insight into the overall dynamics of the magnetosphere. The low levels of magnetic turbulence may be of significance with respect to the development of tearing mode dissipation for reconnection events. The IMP wave observations in the distant magnetosphere boundary region showed that the boundaries were quite diffuse and frequently purely defined. Finally, nearly simultaneous IMP 7 and 8 comparisons were used to achieve an understanding of shock structure and propagation.

N80-32321/5 PC **A02**/MF **A01**
Laboratorio di Ricerca e Technologia per lo Studio del Plasma nello Spazio, Frascati (Italy).
Isotropic Modulation of Galactic Cosmic Rays.
N. Iucci. Oct 79, 16p LPS-79-12
Presented at 16TH. Intern. Cosmic Ray Conf., Kyoto, Aug. 1979.

Phenomena associated with cosmic ray isotropic modulation are reviewed. Both short-term and long-term variations are considered. For the most part, neutrino monitor data is cited. Results are used to explain solar activity cycle-related modulation fluctuations. The effects of Forbush decreases as well as cosmic ray modulation produced by coronal holes are touched on. Possible modulation as a result of 27 day recurrences is postulated. Finally, the power spectra of cosmic ray intensity fluctuations are analyzed using a maximum entropy method.

PB81-110017 PC **A08**/MF **A01**
National Geophysical and Solar-Terrestrial Data Center, Boulder, CO.
Solar-Geophysical Data Number 431, July 1980. Part I (Prompt Reports). Data for June 1980, May 1980 and Late Data,
Helen E. Coffey. Jul 80, 175p SGD-431-PT-1, NOAA-80090901
See also Rept. no. 430, Part 1, PB80-225303.

In addition to an index for 1979-1980, this prompt report provides data for June 1980 on: alert periods, daily solar indices, solar flares, solar radio emission, solar wind measurements, spacecraft observations, mean solar magnetic field and Boulder Geomagnetic Substorm Log. It also provides data for May 1980 on: daily solar activity centers, sudden ionospheric disturbances, spacecraft observations, solar radio emission, cosmic rays, geomagnetic indices, and radio propagation indices. Late data included in this issue presents spacecraft observations for May 1980, daily solar activity centers, cosmic rays Huancayo April 1980, and geomagnetic indices.

PB81-110025 PC **A05**/MF **A01**
National Geophysical and Solar-Terrestrial Data Center, Boulder, CO.
Solar-Geophysical Data Number 431, July 1980. Part II (Comprehensive Reports). Data for January 1980, June 1979 and Miscellanea,
Helen E. Coffey. Jul 80, 78p SGD-431-PT-2, NOAA-80090902
See also Rept. no. 430, Part 2, PB80-225295.

In addition to an index for 1979-1980, this issue of comprehensive reports provides data for January 1980 on: solar radio emission and solar X-ray radiation. Solar flare data, 13 months from date of observations, are published in this issue. The 13-month delay will be continued until Solar Cycle 21 passes well through its maximum. The Abbreviated Calendar Record will be suspended indefinitely. After the section on Solar Flares for June 1979, the Miscellaneous data consists of May 1979 Regional Flare Index, Active Regions Oct 6-Nov 3, 1979, and Synoptic Solar Maps Oct 6-Nov 3, 1979.

4.

ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A089 230/7 PC **A02**/MF **A01**
Emmanuel Coll Boston MA
Long-Term 1.5 GHz Amplitude Scintillation Measurements at the Magnetic Equator.
Rept. for 1 Mar 79-29 Feb 80,
Santimay Basu, Suanda Basu, John P. Mullen, and A. Bushby. 10 Dec 79, 8p SCIENTIFIC-2, AFGL-TR-80-0191
Contract F19628-78-C-0005
Pub. in Geophysical Research Letters, v7 n4 p259-262 Apr 80.

No abstract available.

AD-A089 234/9 PC **A02**/MF **A01**
Louisiana State Univ Baton Rouge Coastal Studies Inst
Diurnal Variations of Radon and Mixing Heights Along a Coast: A Case Study.
Technical rept.,
S. A. Hsu, R. E. Larson, and D. J. Bressan. 7 Dec 79, 7p Rept no. TR-304
Contract N00014-75-C-0192
Pub. in Jnl. of Geophysical Research, v85 nC7 p4107-4110, 20 Jul 80.

No abstract available.

AD-A089 373/5 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Structuring of Collisionless, High Velocity Ion Clouds.
Memorandum rept.,
J. A. Fedder. 4 Sep 80, 15p Rept no. NRL-MR-4307

The stability of high velocity ion clouds was studied in the ionosphere-magnetosphere. We derive the instability growth rate; show that the growth is very fast; and present our conclusions.

AD-A089 374/3 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Conductivity Formulas for the Disturbed Ionosphere.
Memorandum rept.,
J. A. Fedder. 4 Sep 80, 15p Rept no. NRL-MR-4329

Conductivity formulas are presented for the disturbed ionosphere. These formulas are recommended for use in HANE simulation studies and for other disturbed ionospheric conditions.

AD-A089 444/4 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Nitric Oxide in the Upper Stratosphere and Mesosphere.
Final rept. 1 Oct 77-30 Sep 79,
William Swider. 1979, 12p Rept no. AFGL-TR-80-0252
Pub. in Proceedings of the NATO Advanced Study Institute of Atmospheric Ozone: Its Variation and Human Influences p263-272, 1-13 Oct 79, Rept. no. FAA/EE-80-20, AD-A088 889.

No abstract available.

AD-A089 470/9 PC **A02**/MF **A01**
Boston Coll Chestnut Hill MA Space Data Analysis Lab
Tidal Structure of the Thermosphere at Equinox,
Henry B. Garrett, and Jeffrey M. Forbes. 27 Jul 77, 14p AFOSR-TR-80-0821
Grant AFOSR-77-3223
Pub. in Jnl. of Atmospheric and Terrestrial Physics, v40 p657-668 1978.

No abstract available.

AD-A089 471/7 PC **A02**/MF **A01**
Control Data Corp Minneapolis MN
Long-Period Waves in Mesospheric Winds at Saskatoon (52 N),
A. D. Belmont, and G. D. Nastrom. 10 Jun 78, 10p AFOSR-TR-80-0827
Contract F44620-76-C-0092
Pub. in Jnl. of Geomagnetism and Geoelectricity (Japan), v31 p165-171 1979.

No abstract available.

AD-A089 546/6 PC **A02**/MF **A01**
Boston Coll Chestnut Hill MA Space Data Analysis Lab
Tidal Variations in Thermospheric O, O2, N2, Ar, He, and H,
Jeffrey M. Forbes. 11 Jan 78, 10p AFOSR-TR-80-0820
Grant AFOSR-77-3223
Pub. in Jnl. of Geophysical Research, v83 nA8 p3691-3698, 1 Aug 78.

No abstract available.

AD-A089 627/4 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Some Basic Investigations on IR Optical Constants of Aerosol Substances.
Scientific rept.,
Frederic E. Volz. 1980, 4p Rept no. AFGL-TR-80-0253
Pub. in Proceedings of International Radiation Symposium, 11-16 Aug 80, Colorado State Univ., Fort Collins, p196-198.

No abstract available.

N80-31971/8 PC **A06**/MF **A01**
Alabama Univ. in Huntsville. School of Science and Engineering.
Numerical Simulation of Advection Fog Formation on Multi-Disperse Aerosols Due to Combustion-Related Pollutants.
Final Report.
R. J. Hung, and G. S. Liaw. Jul 80, 118p NASA-CR-161566, UAH-RR-248
Contract NAS8-31729

The effects of multi-disperse distribution of the aerosol population are presented. Single component and multi-component aerosol species on the condensation/nucleation processes which affect the reduction in visibility are described. The aerosol population with a high particle concentration provided more favorable conditions for the formation of a denser fog than the aerosol population with a greater particle size distribution when the value of the mass concentration of the aerosols was kept constant. The results were used as numerical predictions of fog formation. Two dimensional observations in horizontal and vertical coordinates, together with time-dependent measurements were needed as initial values for the following physical parameters: (1)wind profiles; (2) temperature profiles; (3) humidity profiles; (4) mass concentration of aerosol particles; (5) particle size distribution of aerosols; and (6) chemical composition of aerosols. Formation and dissipation of advection fog, thus, can be forecasted numerically by introducing initial values obtained from the observations.

N80-31979/1 PC **A02**/MF **A01**
Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
A Computer Program for the Scattering of a Pollutant UN Programme de Calcul de la Dispersion d'UN Pollutant.
A. Foussat. 1979, 21p VKI-PREPRINT-1979-4
Text in French. Presented at Intern. Assoc. For Hydraulic Res. Seminar on les Refrigerants Atmospheriques, Chatou, France, 13-14 Nov. 1978.

A computer program for atmospheric diffusion in the presence of a pollutant with a density different from that of air is presented. This program is chiefly aimed at the prediction of gas concentrations near large buildings. After computation of the velocity field, the scattering of a pollutant is determined in the field. However, in the case of a nonstationary velocity field, both computations may be made together. A few examples are given.

N80-31994/0 PC **A05**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.
Theoretical and Experimental Investigations of Upper Atmosphere Dynamics.
Final Report.
R. G. Roper, and H. D. Edwards. Jul 80, 90p NASA-CR-163519
Contracts NGL-11-002-004, PROJ. E-16-605

A brief overview of the significant contributions made to the understanding of the dynamics of the Earth's upper atmosphere is presented, including the addition of winds and diffusion to the semi-empirical Global Reference Atmospheric Model developed for the design phase of the Space Shuttle, reviews of turbulence in the lower thermosphere, the dynamics of the equatorial mesopause, stratospheric warming effects on mesopause level dynamics, and the relevance of these studies to the proposed Middle Atmosphere Program (1982-85). A chronological bibliography, with abstracts of all papers published, is also included.

N80-31996/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Polar Nephelometer for Atmospheric Particulate Studies.
M. Z. Hansen, and W. H. Evans. 1980, 31p NASA-TM-81113
Submitted for Publication.

A polar nephelometer for use in studying atmospheric aerosols was developed. The nephelometer detects molecular scatter from air and measures scattering from very clean air using pure molecular scattering for calibration. A compact system using a folded light path with an air cooled argon laser for the light source was designed. A small, sensitive detector unit permits easy angular rotation for changing the scattering angle. A narrow detector field of view of + or - 1/4 degree of scattering along with a single wavelength of incident light is used to minimize uncertainties in the scattering theory. The system is automated for data acquisition of the scattering matrix elements over an angular range from 2 degrees to 178 degrees of scattering. Both laser output and detector sensitivity are monitored to normalize the measured light scattering.

N80-32023/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Initial Direct Strike Lightning Data.
F. L. Pitts, and M. E. Thomas. Aug 80, 25p NASA-TM-81867

Data waveforms of the rate of change of electric flux density obtained during two lightning strikes to an aircraft specially instrumented for lightning electromagnetic measurements are presented. The aircraft was operating in a thunderstorm environment to elicit strikes. The instrumenttion system configuration, flight conditions, and strike scenario showing probable lightning path on the aircraft are described. The waveforms, which were obtained at a 10 nanosecond sample interval, indicate significant excursions of the rate of change of electric flux density occurred over few hundred nanoseconds time interval.

PB81-108219 PC **A07**/MF **A01**
Pennsylvania State Univ., University Park. Dept. of Meteorology.
Calculation of Albedo and Infrared Flux Calibrated by Satellite Observations: Results for Time Mean Values Over Continents and Oceans and Interannual Changes Over Land,
John J. Cahir, Michael D. Fromm, Hans A. Panofsky, and Lanning Penn. Aug 80, 137p NOAA-80090813
Grant NOAA-04-6-158-44013

Monthly mean albedo and infrared flux was estimated by regression methods, using monthly averaged conventional meteorological variables which are associated with cloudiness and/or cloudiness change as predictors. Developmental equations were derived from 36 months of the 42 month archive of data from NOAA satelltes, for the overland work, and of 41 months over the oceans.

PB81-108292 PC **A06**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
Computed Refraction and Absorption Fluctuations Caused by Temperature, Humidity, and Pressure Fluctuations - Radio Waves to 5 Micrometers.
Technical memo.,
R. J. Hill, S. F. Clifford, and R. S. Lawrence. Jun 80, 108p NOAA-TM-ERL-WPL-59, NOAA-80081104

The dependence of fluctuations in atmospheric absorption and refraction upon fluctuations in temperature, humidity and pressure is found for infrared frequencies. This dependence has contributions from line and continuum absorption and from anomalous refraction by water vapor. The functions that relate these fluctuations are necessary for evaluating degradation of electromagnetic radiation by turbulence. They are computed for a given choice of mean atmospheric conditions and graphed as functions of frequency in the wavelength range from radio waves to 5 micrometers. It is found that turbulent fluctuations in total pressure give a negligible contribution to absorption and refraction fluctuations. Humidity fluctuations dominate absorption fluctuations, but contributions by temperature fluctuations can be non-negligible. Fluctuations in both temperature and humidity affect refraction fluctuations. Sufficiently strong humidity fluctuations can dominate the refraction fluctuations for some infrared frequencies but not for visible frequencies.

PB81-800187 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nitrogen Oxide Air Pollution: Atmospheric Chemistry. 1964-1978 (Citations from the NTIS Data Base).
Rept. for 1964-78,
Diane M. Cavagnaro. Oct 80, 253p
Updates NTIS/PS-74/089.

Research reports on photochemical air pollution models, smog chemistry and reactivity, and SSt exhaust effects are cited in the bibliography. Auroral and upper atmospheric in chemistry, and photochemistry of naturally occurring nitrogen oxides are excluded. (Contains 247 citations)

PB81-800195 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nitrogen Oxide Air Pollution: Atmospheric Chemistry. 1979-August, 1980 (Citations from the NTIS Data Base).
Rept. for 1979-Aug 80,
Diane M. Cavagnaro. Oct 80, 69p
Supersedes NTIS/PS-79/1059, and NTIS/PS-78/0973. Updates NTIS/PS-74/089.

Photochemical air pollution models, smog chemistry and reactivity, and SSt exhaust effects are covered in the bibliography. Auroral and upper atmospheric chemistry, and photochemistry of naturally

occurring nitrogen oxides are excluded. (This updated bibliography contains 63 citations, 40 of which are new entries to the previous edition.)

4B. Meteorology

NUREG/CR-1585 PC **A11**/MF **A01**
Aeronautical Research Associates of Princeton, Inc., NJ.
Modeling Tornado Dynamics.
Final rept. Jan 76-May 80,
W. S. Lewellen, and Y. P. Sheng. Sep 80, 234p ARAP-421
Contract NRC-04-76-218

This report details the results of a research program aimed at providing NRC with a definitive theoretical model of the tornado, low-level flowfield. It includes a critical review of existing theoretical models and the detailed accounting of an axisymmetric numerical model based on turbulent transport theory. Model verification tests show reasonable comparisons with laboratory and limited field results. An extensive model sensitivity analysis shows the flowfield is most dependent on the ambient vertical vorticity and horizontal convergence occurring in the parent thunderstorm. It is also quite sensitive to surface roughness. Dominant features of the model results are the low altitude at which the maximum windspeed occurs and the large magnitude of velocity fluctuations which occur close to the surface. When available dual Doppler observations are used to impose boundary conditions on a model domain with a 1Km radius and 1Km height, estimates of the maximum windspeed suggest that speeds in excess of 125 m/sec should be model wind distribution which can be used in further engineering design studies. Five previously published papers reporting partial results of the research program are included as appendices.

N80-32034/4 PC **A04**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
On the Dynamic Forcing of Short-Term Climate Fluctuations by Feedback Mechanisms.
E. R. Reiter. Sep 79, 68p NASA-CR-162865, COO-1340-66
Grant NSG-5340, Contract EY-76-S-02-1340

Various internal feedback mechanisms in the ocean atmosphere system were studied. A variability pattern of sea surface temperature with a quasibiennial oscillation (QBO) was detected off the coast of Senegal, in the Gulf of Guinea and even in the Gulf Stream as it leaves the North American continental shelf. Possible physical connections between some of these QBO's were pointed out by a hypothetical feedback model. Interaction of a QBO with the annual cycle may lead to beating frequencies resembling climatic trends of a duration of several years.

N80-32038/5 PC **A02**/MF **A01**
Royal Netherlands Meteorological Inst., De Bilt. Statistisch Bureau.
Results of Comparative Measurements with Various Types of Pluviometers During the Period of December 1971 to January 1975 at de Bilt, Netherlands Resultaten van Vergelijkende Metingen Met Diverse Typen Regenmeters in Het Tijdvak December 1971 - Januari 1975 Te de Bilt.
A. Denkema. 1980, 6p KNMI-V-342
Text in Dutch.

Precipitation amounts and averages are given for ten different types of raingage installed at the same site. A national raingage for the Netherlands with a 200 cm sq opening was among the instruments used. The placement of the instruments relative to each other is shown.

N80-32039/3 PC **A03**/MF **A01**
Royal Netherlands Meteorological Inst., De Bilt. Wetenschappelijk Onderzoek.
Climatology in the Netherlands. Abstracts of Seven Lectures Given on Climate Day Klimaatonderzoek in Nederland. Samenvattingen van een 7-Tal Lezingen Gehouden OP de 'Klimaatdag' 30 Januari 1980 Te de Bilt.
1980, 46p KNMI-V-345
Text in Dutch. Lectures Presented at de Bilt, Netherlands, 30 Jan. 1980.

Climatology is studied with emphasis on climate change and modeling. Topics include use of fossil pollens in climate study, pollen research in Greece, modeling of ice caps, climate research using archival material, dendroclimatology and isotopes.

N80-32040/1 PC **A03**/MF **A01**
Royal Netherlands Meteorological Inst., De Bilt. Fysisch Meteorologisch Onderzoek.
The Occurence of a Nocturnal Wind Maximum at Low Altitude Het Optreden van een Nachtelijk Windmaximum OP Lage Hoogte.
A. G. M. Driedonks. 1980, 28p KNMI-V-346
Text in Dutch. Presented at Colloq., de Bilt, Netherlands, Nov. 1979.

A model is used to explain wind variation above the nocturnal boundary layer. Observations from Cabauw, the Netherlands are presented. It is shown that the maximum wind phenomenon may have a large horizontal spread. The circumstances favorable for the occurence of nocturnal wind maxima are shown.

N80-32041/9 PC **A04**/MF **A01**
Royal Netherlands Meteorological Inst., De Bilt. Wetenschappelijk Onderzoek.
Anthropogenic Climate Changes. State-of-the-Art Survey Antropogene Klimaatsveranderingen. Overzicht van de Stand van Zaken.
J. Reiff, and C. J. E. Schuurmans. 1980, 58p KNMI-V-347
Partly in Dutch and English.

Climate change on both a global regional scale is discussed. The consequences of increased levels of freon, aerosols, CO2, and heating are examined as well as the effects of deforestation of tropical regions, increased desertification, and creation of artificial lakes. Urban climate and precipitation downwind from industrial zones are included.

N80-32042/7 PC **A03**/MF **A01**
World Meteorological Organization, Geneva (Switzerland).
Conversion of Grid-Point Data into Meteorological Maps with a Mini-Computer System.
D. Soederman, and L. Winberg. 1980, 47p WMO-553, WWW-PLR-37

The hardware and software required for installing and operating a grid-to-map conversion system at a regional or national meteorological center are described. General information is given on system configurations to be used for the conversion, including a mini-computer and plotter, or a direct computer-to-facsimile system. The software systems required to decode and generate maps from data encoded in the World Meteorological Organization GRID/GRAF codes are discussed and the graphical conversion system in operation at the Finnish Meteorological Institute is described.

N80-32043/5 PC **A03**/MF **A01**
Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Environmental Wind in Built-Up Areas.
D. Olivari. Feb 80, 46p VKI-TM-26
Presented at Symp. On Recente Evolutie in de Hoogbouw, Leuven, Belgium, 28-29 Mar. 1979.

The interaction between man-made structures and surface wind was studied. The structure of atmospheric winds and the effects of wind on human comfort are reviewed and the wind flow through built up areas is examined. The experimental techniques used and results obtained are discussed. It is shown that many observed effects are not clearly understood and that the only tool available for the prediction of the wind condition at the pedestrian level for new building developments is the wind tunnel.

PB81-102527 PC **A05**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
A Comparison of Radar Backscatter Profiles with Rawin Meteorological Profiles.
Technical memo.,
R. B. Chadwick, G. Morrison, R. Zamora, and E. E. Gossard. Jun 80, 92p NOAA-TM-ERL-WPL-58, NOAA-80082001

The results of 2-1/2 months of data collected in the late summer and fall of 1977, with an FM-CW Radar of the Wave Propagation Laboratory is presented. Profiles are compared from the local RAWINSONDE with the frequency distribution of the signal for the two hours of the day containing the local RAWINSONDE observation. In these observations the radar was located at Buckley Field near Denver, Colorado about four miles from Stapleton Airport where the RAWINSONDE was taken. It was concluded that any radar system that is to be used to deduce meteorological stratification must have fine enough spatial resolution to resolve insects and separate their return from the Bragg return from the clear air.

PB81-104952 PC **A12**/MF **A01**
Water and Power Resources Service, Denver, CO.
HIPLEX Rawinsonde Skew T-Log P Analyses, 1979,
Francis E. Politte, David A. Matthews, and G. A. Mentgen. Jun 80, 259p

Thermodynamic analyses of stability and moisture for all HIPLEX rawinsonde observations are plotted on skew T-log P diagrams and wind vectors are plotted at mandatory levels. Soundings were observed at Miles City, Montana; Baker, Montana; and seven mesoscale network sites near Big Spring, Texas; from May through July 1979. This report provides documentation on the method of observation, data reduction techniques, and analysis software available on the Service's Environmental Data Network.

PB81-107997 PC **A07**/MF **A01**
AIRAO, Inc., Pagosa Springs, CO.
Field Site Direction of Preparatory Observation for Determining Effectiveness of Program of Applied Weather Modification in the Canary Islands.
Final rept.,
Albert H. Schnell. 12 Jul 80, 132p
Contract DI-0-07-85-V0031

This report describes work performed by AIRAO INCORPORATED during the period, December 1979 through July 1980, concerning field site direction of preparatory observation for determining effectiveness of program of applied weather modification in the Canary Islands. Work conducted in the 1979-1980 season consisted of observation of small convective systems within the sea of clouds over the Canarian Archipelago, using ground based radar and airborne instrumentation, Cloud Condensation Nuclei counter and simple drop-recording equipment. These observations fall under a preliminary studies phase. Three basic cloud types have been identified and are considered for further detailed studies: Warm Sea Clouds, Warm Orographic Clouds, and Cold Clouds.

PB81-108086 PC **A02**/MF **A01**
National Weather Service, Honolulu, HI. Pacific Region.
The Estimation of Cirrus Cloud Over Oahu.
Technical memo.,
Michael J. Morrow. Aug 80, 17p NOAA-NWSTMS-PR-21, NOAA-80091508

While this study deals with and presents a climatology of cirrus as observed from Oahu, its results will, with some modification, be useful on the Big Island and Maui. Satellite pictures indicate more cirrus cloudiness over the southern islands than over Oahu.

PB81-108201 PC **A05**/MF **A01**
National Climatic Center, Asheville, NC.
A Long Record of Weather Observations in Southeastern Iowa, 1839-1979.
Historical climatology series,
Henry F. Diaz. Jul 80, 91p NOAA-80090808

Data from three stations (Clinton, Iowa City, and Muscatine) in southeastern Iowa are summarized.

The station histories of Iowa City and Muscatine are interrelated and the third station, due to its proximity and comparable length of records, was included. The following variables are summarized: (a) mean monthly and annual temperature; (b) monthly and annual total precipitation, (c) mean monthly and annual maximum and minimum temperature; (d) highest and lowest monthly and annual maximum and minimum temperature; (e) highest and lowest monthly and annual temperature; (f) seasonal mean temperatue (Winter: Dec-Feb, Spring: Mar-May, etc); (g) seasonal total precipitation; (h) total monthly and seasonal (Oct-Apr) snowfall; (i) the dates of last frost (or 32 deg F temperature) in spring and the first one in autumn; and (j) the number of clear and cloudy days per month. Time series graphs are presented for seasonal and annual temperature and precipitation and seasonal snowfall totals. A least-squares, fifth order polynomial fit was drawn to accentuate temporal fluctuations.

PB81-108227 PC **A03**/MF **A01**
National Weather Service, Salt Lake City, UT. Western Region.
An Operational Evaluation of the Scofield/Oliver Technique for Estimating Precipitation Rates from Satellite Imagery.
Technical memo.,
Richard Ochoa. Aug 80, 27p NOAA-TM-NWS-WR-157, NOAA-80090202

A technique for estimating rainfall rate quantitatively from satellite imagery, the Scofield/Oliver technique, was tested in Arizona during the summer of 1978. Although the number of cases is small, some interesting cases illustrating potential weaknesses of the technique in the western United States are discussed and recommendations for eliminating these weaknesses are given.

PB81-108235 PC **A04**/MF **A01**
Georgia Marine Science Center, Savannah.
Oceanographic and Meteorological Data 15 km Off the Coast of Georgia. Data Report Number 2.
Technical report series,
J. O. Blanton, L. L. Bailey, D. W. Hayes, and A. S. Dicks. Aug 79, 64p TRS-80-5, NOAA-80082702
Grant NOAA-04-6-158-44115
Prepared in cooperation with Skidaway Inst. of Oceanography, Savannah, GA., and Savannah River Lab., Aiken, SC.

This series of data reports provides graphical display of environmental data from the nearshore continental shelf off the Georgia coast. The data are automatically recorded on the Savannah River Navigational Light Tower located about 15 km offshore at an ocean depth of 16 meters. Meteorological data consist of air temperature, wind velocity and barometric pressure. Oceanographic data include ocean temperature at 6 depths and ocean currents at 2 depths. The graphical presentations consist of displays of the hourly averages over a 16-week period from May to September 1977.

PB81-108276 PC **A03**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
FM-CW Radar Observations in Northeastern Colorado Compared with Rawinsonde-Measured Profiles of Refractive Index.
Technical memo.,
E. Gossard, R. Chadwick, and D. Wolfe. May 80, 40p NOAA-TM-ERL-WPL-57, NOAA-80081319

This report deals primarily with a long period during which the FM-CW radar and a RAWINSONDE station were operated side-by-side in the NHRE program in 1974. The RAWINSONDE station and the FM-CW radar were colocated at Sterling in northeastern Colorado. Three balloons a day were launched while the radar operated in a vertically pointing, non-Doppler mode. It is concluded that the radar is a reliable detector of elevated refractive layers. In fact it provides a better estimate of the height and persistency of such layers than do balloon soundings because layers undulate and the refractive index distribution is often transient and patchy. Single balloon sounding data cannot provide the important persistency information. Insects are shown to be an important contaminant in the radar observations. It is demonstrated that insect targets are adequately separated from the clear-air returns if the range resolution of the radar is good (typically 3 mi in the case of the Sterline observations). This ability is needed in biogeographical areas such as the U.S. Midwest if the clear-air elevated layers of meteorological interest are to be distinguished from insect layers.

PB81-108300 PC **A02**/MF **A01**
National Weather Service, Salt Lake City, UT. Western Region.
Lightning Activity Levels,
Mark A. Mollner. Jul 80, 21p NOAA-NWS-WRCP-14, NOAA-80081102

This program computes Lightning Activity Level (LAL) and J. R. Sims cloud cover (SCC) forecasts for the Western United States. The resultant LAL/SCC forecast map can be used routinely in the briefing of Land Management Agencies at BIFC (Boise Interagency Fire Center). Western Region Fire Weather forecasters will recognize that this LAL/SCC forecast map is essentially the same as was distributed on RAFAX a few years ago. The program is written in Data General Fortran IV. For computation of the LAL/SCC forecast, a small amount of edit work to one RDOS file on an AFOS ADM is needed. However, once AFOS is fully operational, this step can be performed by the AFOS minicomputer.

PB81-108367 PC **A02**/MF **A01**
National Weather Service, Salt Lake City, UT. Western Region.
Regression Equation for the Peak Wind Gust 6 to 12 Hours in Advance at Great Falls During Strong Downslope Wind Storms.
Technical memo.,
Michael J. Oard. Jul 80, 19p NOAA-TM-NWS-WR-154, NOAA-80082002

Strong downslope winds are common in Montana along the East Slopes of the Rockies from fall to spring. Wind gusts over 100 MPH occur in some areas each year producing property damage and personal injuries. These winds occur in a variety of synoptic weather patterns, but the most frequent with the strongest winds occur in well-defined warm air advection patterns ahead of an eastward advancing upper trough. This suggests that the speed of downslope winds for these cases can be objectively predicted with a multiple regression equation similar to the MOS equations produced by TDL. This paper describes the development and verification of a regression equation for the peak wind gust 6 to 12 hours in advance at Great Falls. The purpose of this research project was an objective criterion that would alert the forecaster to the synoptic potential for damaging winds, so that a high wind warning can be issued well in advance, if needed.

PB81-110314 PC **A04**
National Oceanic and Atmospheric Administration, Washington, DC. Environmental Data and Information Service.
Environmental Satellite Imagery May 1980.
Apr 80, 72p KMRD-5.4-8004, NOAA-80091506
Key to Meteorological Records Documentation. See also report dated Mar 80, PB80-225857.

The Key to Meteorological Records Documentation (KMRD) No. 5.4 series is issued monthly to describe current cloud data obtained by NOAA's operational environmental satellites. It contains daily global satellite imagery in condensed form as a guide to data stored in the NOAA archive, and is designed to help users select data for research and climatological use.

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A089 166/3 PC **A11**/MF **A01**
General Accounting Office Washington DC Energy and Minerals Div
Increasing Costs, Competition May Hinder U.S. Position of Leadership in High Energy Physics.
16 Sep 80, 233p Rept no. GAO/EMD-80-58
Report to the Congress.

Contents: Introduction; A Perspective on World Leadership in High Energy Physics; Federal Role in High Energy Physics in the Context of all Basic Sciences; Need for Integrity between Objectives, Plans, and Budgets; Selected Policy Options for the U.S. High Energy Physics Program; Conclusions, Recommendations, and Matters for Consideration by the Congress; and Agencies' and Laboratories' Comments and our Evaluation.

AD-A089 200/0 PC **A03**/MF **A01**
Advisory Group for Aerospace Research and Development Neuilly-sur-Seine (France)
AGARD Handbook.
Jul 80, 50p

This Handbook is intended as an introduction to AGARD and its activities for: new members of the AGARD community, including newly-appointed members of AGARD Panels and Working Groups and new members of AGARD staff; present members of the AGARD community who may wish to have available a brief reference booklet on the Agency and its organization and operations; and scientists, engineers, service officers and administrators in NATO Member-Nations who are asked by AGARD to participate in its activities as authors, consultants, lecturers or contributors to symposia, or who would like to gain an understanding of AGARD's mission and organization. Though intended as a general guide to AGARD, the Handbook includes the official texts of the AGARD Charter and the AGARD By-Laws.

AD-A089 285/1 PC **A07**/MF **A01**
Naval Postgraduate School Monterey CA
A Review of the Historical Development and Contemporary Management Structure of Military Club Systems.
Master's thesis,
James Matthew Clark. Jun 80, 135p

This study was used to examine the origins and historical development of U.S. military officer and enlisted clubs. It discusses the historical development of the current objectives, modes of operation, and legal basis of military clubs. Congressional oversight of military club activities is covered with particular emphasis being given to related Congressional hearings and General Accounting Office (GAO) reviews conducted between 1970 and 1980. A detailed analysis of the U.S. Navy club systems structure is also presented. Current Navy club management problems are documented and potential management options are advanced to deal with these problems. A model for ranking individual Navy clubs based on location, rank of members, and costs of membership is included in the report. Though specific recommendations are limited to the Navy club system, they are applicable to club systems of all four armed service branches. (Author)

AD-A089 291/9 PC **A05**/MF **A01**
Naval Postgraduate School Monterey CA
A Primer and Checklist for the Technology Transfer/Knowledge Utilization Process.
Master's thesis,
Gale Dean Brink. Mar 80, 93p

This thesis details steps of the knowledge utilization process which are applicable to individuals

and organizations and develops a model of an organization in which the process takes place. Elements of four categories (INPUT RESOURCES, ORGANIZATION, OUTPUTS and ENVIRONMENT) are analyzed to determine the characteristics that influence the use and transfer of knowledge. Models show the interrelationships between characteristics that describe each element and are combined into an integrated model of the organization to show the relationships between elements. The author concludes that three resources, individuals, knowledge and time, are critical to the organization and the knowledge utilization process. 'Used' in both planning and production, they result in organizational output that may satisfy a need in the organization's environment. Because time is the limiting resource, planning (assessing the interrelationships, alternatives and consequences) is important in effectively managing the use of other resources and should precede individual and organizational activity. (Author)

AD-A089 292/7 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA
The Role of the Project Manager and Project Organization in Turkish Naval Weapon System Acquisition.
Master's thesis,
Erdal Toprakhisar. Dec 79, 70p

This thesis addresses some of the many issues associated with the role of the project manager in weapon system acquisition for the Turkish Navy. Three different project manager organizations are examined: Functional, Project and Matrix. The interrelationship of many government agencies are considered and major tasks are defined. The Project Manager's participation in the weapon system acquisition and his staff's organization are presented. Finally, the specific program office organization, program coordinator structure is developed that would be implemented in the Turkish Navy. (Author)

AD-A089 294/3 PC **A05**/MF **A01**
Naval Postgraduate School Monterey CA
A Survey of Internal Review in the U. S. Marine Corps.
Master's thesis,
John C. Baggette. Jun 80, 84p

Internal review, the Marine Corps field commander's in-house audit function, has received increasing attention recently because of its potential contribution to improved economy, efficiency and effectiveness of operations. A new Marine Corps directive on the subject expands the role of the function to a level approaching the full scope of auditing as defined by General Accounting Office standards. This thesis discusses the background of internal review and examines field compliance with current directives and a group of preferred practices from the private sector. Data from a survey of internal review groups is used to evaluate compliance against a base case model and to discuss the causes of noncompliance. The survey covered over one half of the internal review groups in the Marine Corps and was conducted using on-site visits and telephone interviews. Recommendations for improvement are presented for areas where significant findings resulted. (Author)

AD-A089 321/4 PC **A02**/MF **A01**
Wharton School Philadelphia PA Dept of Decision Sciences
Model Management Systems: An Overview.
Technical rept.,
Joyce J. Elam. Dec 79, 15p Rept no. 79-12-04
Contract N00014-75-C-0440

This paper presents an architecture for a generalized model management system that facilitates the integration of management science models into a decision support system. The model management system will provide a methodology for making mapping more scientific. The linking together of models with data and solution processes is a difficult and time-consuming process for a user of such models. The model management system will automate this linking as much as possible. (Author)

AD-A089 328/9 PC **A08**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
Multiple Model Demand Forecasting Compared to Air Force Logistics Command D062 Performance.
Master's thesis,
Todd R. Garland, and Henry P. Mitchell. Jun 80, 168p Rept no. AFIT-LSSR-61-80

The purpose of this study was to determine if a multiple model forecasting technique could forecast demand more accurately than the model currently used in the Air Force Logistics Command D062 System for expendable (non-recoverable) items. Simulated and actual data were used to check the results. The methods utilized in the multiple model technique were an eight-term moving average, a four-term moving average, exponential smoothing, adaptive smoothing, a least squares fit and a ratio of change between years method. Results were compared in terms of mean absolute deviation adjusted to show percentage change in accuracy compared to the D062. The statistical test used for comparison was the t-test for matched pairs. This test indicated approximately a seventeen percent improvement in accuracy using either simulated or real data. (Author)

AD-A089 330/5 PC **A05**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
Proposed Criteria for Evaluation of the Reliability Improvement Warranty Concept.
Master's thesis,
James M. Bradney, and Mark M. Perkins. Jun 80, 86p Rept no. AFIT-LSSR-63-80

The objective of this research was to determine if a set of criteria could be nominated for the evaluation of the RIW concept. Currently, a plan for evaluating RIW is to occur in FY 82/83. The literature search revealed that the evaluation plan had not been formalized because there was no known methodology to conduct an evaluation. To aid in the formulation of an evaluation plan the researchers interviewed contracting officers and program managers to determine what criteria was important in their program. The research discovered that there was agreement among the two groups, contracting officers and program managers; however, there was disagreement among the group as a whole. (Author)

AD-A089 331/3 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
Selected Effects of Contractor Reactions to Standardization of Avionics Acquisitions.
Master's thesis,
Jeffrey W. Ackerson, and George H. Baum. Jun 80, 122p Rept no. AFIT-LSSR-64-80

This study surveyed the attitudes of avionics contractor community regarding the effects of varying degrees of avionics standardization on their company's market position, and their perception of how these levels would affect equipment availability, acquisition cost, ownership cost, and technological advancement to the USAF. A structured attitudinal survey and an open-ended set of questions were used to obtain the contractor's attitudinal position. The following conclusions can be implied: increasing levels of standardization will adversely affect company's market position; increasing standardization will increase equipment availability, increase acquistion costs, decrease ownership costs, and adversely affect technological advancements. Additionally, there appears to be a high degree of interest to maintain competition in the market, obtaining multi-year contracts, resolving the requirement for specialization or generalization in avionics, and getting more System Program Office attention to avionics standardization issues. Various recommendations are proposed to help resolve these issues. (Author)

AD-A089 339/6 PC **A03**/MF **A01**
Wharton School Philadelphia PA Dept of Decision Sciences
Model Management Systems: An Approach to Decision Support in Complex Organizations.
Technical rept.,
Joyce J. Elam, John C. Henderson, and Louis W. Miller. Aug 80, 41p Rept no. 80-08-04
Contract N00014-75-C-0440

This paper describes a system designed to extend the traditional DSS concept in order to support the model management requirements of complex organizations. Its objectives are to provide a mechanism to represent and to diffuse the organizational knowledge about models so that the user community can utilize this knowledge to adapt or build decision aids. (Author)

AD-A089 349/5 PC **A08**/MF **A01**
Naval Postgraduate School Monterey CA
An Analysis of the Commercial and Industrial Type Activities Program within the United States Army.
Master's thesis,
John Sherwood Everette. Jun 80, 160p

This thesis explores the application of the Commercial and Industrial Type Activities (CITA) program to Department of the Army (DA) installations with particular emphasis on the problems associated with the attempt to implement the revised Office of Management and Budget (OMB) Circular No. A-76 in Fiscal Year 1980 (FY 80). Initial discussion covers the evolution of the CITA program and the current guidance and implementing instructions of OMB, Department of Defense (DOD), and DA. This is followed by a description of the training program for CITA management personnel. Based on discussions between the author and DA installations and Major Army Commands, an analysis of key problem areas and varying approaches to the implementation of the A-76 policy in FY 80 is presented. Fort Gordon's CITA review, which was designated by DA as a pilot study for umbrella type CITA contracts and the first DA installation to follow the procedures of the revised A-76, is described. Conclusions and recommendations are intended to assist DA installations in their attempt to complete the required 100% review of their CITA inventory by FY 84. (Author)

AD-A089 363/6 PC **A07**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
A Computer Based Scheduling System for Use by Base Level Civil Engineering in Development of the In-Service Work Plan.
Master's thesis,
Troy E. Belyeu, and John E. Kuhn. Jun 80, 148p Rept no. AFIT-LSSR-47-80

Austere funding, reduced manning, and scarce resources make it important for Air Force Civil Engineering managers to take advantage of the most current and efficient technology available to accomplish routine and repetitive tasks. The requirement to allocate limited manhours among competing requirements in the In-Service Work Plan is becoming increasingly important. The authors of this thesis have developed a computer based scheduling system that constructs as currently existing manual methods. The system uses a payoff matrix to determine the value of completing a specific work order and a linear programming model to determine the best mix of work orders to schedule from the pool of backlogged work orders. Use of the payoff matrix concept provides the flexibility for each Civil Engineering Organization to determine the factors to consider and their relative weights in arriving at a benefit value for each work order. The conclusion reached in the thesis is that the computer based scheduling system will construct the In-Service Work Plan as effectively as currently existing manual methods and that the system is feasible for use at any Civil Engineering Organization, provided adequate computer capability is available. (Author)

AD-A089 364/4 PC **A10**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
A System Dynamics Analysis of the Factors Affecting Combat Readiness.
Master's thesis,
Robert P. Andrews, and James F. Shambo. Jun 80, 213p Rept no. AFIT-LSSR-48-80

The term 'Combat Readiness' is used in the United States Air Force as the basis for managing resources. There is no clear understanding of what factors affect combat readiness or how the factors that do affect it interact to determine a unit's level of readiness. Due to this lack of understanding, no analytical vehicle has been developed which will enable a commander to determine how a change in policy will affect combat readiness prior to the

policy's implementation. To aid in the understanding of the elements which interact to determine a unit's level of readiness, a system dynamics analysis of the factors affecting readiness was accomplished. Key managers within the United States Air Force combat readiness system were interviewed and the information acquired in these interviews was used to develop a large scale policy model for the management of combat readiness. The combat readiness model is comprised of ten sectors which address the interactions of personnel and equipment readiness. The generation of pressures to improve readiness and its affect on combat readiness is also addressed. Further development and use of this model to manage combat readiness will enable commanders to determine in advance the effect of policy changes. (Author)

AD-A089 396/6 PC **A07**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
A Critical Analysis of Management Indicators for the Director of Materiel Management, Sacramento ALC.
Master's thesis,
Mary K. Allen, and Robert E. Linteau. Jun 80, 126p Rept no. AFIT-LSSR-50-80

Recent correspondence and conferences within the Air Force Logistics Command have questioned the reliability of management indicators as an information tool. The purpose of this thesis was to prove or disprove that contention through an analysis of the management indicators periodically reviewed by the Director of Materiel Management at the Sacramento Air Logistics Center. Questionnaires and personal interviews were used as the means to define D/MM objectives and goals. The indicators themselves were defined and then evaluated in terms of their information contribution to decision making and in turn to the achievement of goals and objectives. The objectives were also classified into a hierarchy of information needs to establish the time spans for planning and control. Our research findings concluded that the present information system is process oriented and, therefore, of little value in strategic planning. Present indicators are inadequate to meet the D/MM's information needs. (Author)

AD-A089 398/2 PC **A04**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
Computed MISTR Requirement Changes and Parts Support - Analysis of a Mismatch.
Master's thesis,
Matthew R. McGuire. 9 Jun 80, 60p Rept no. AFIT-LSSR-59-80

One of the primary responsibilities of the Air Force Logistics Command (AFLC) is the determination of material requirements for Air Force centrally procured items (1:p.1-1). A part of this responsibility is to insure that optimum material support is available with a minimum cost to the national economy (1:p.1-1). In order to achieve this objective, the AFLC uses an economic order quantity (EOQ) philosophy whereby requirements for items are computed to maintain stock at a level which will both satisfy customer demands and provide the minimum ordering and holding costs (1:p.2-1). EOQ items are nonrecoverable (they can be thrown away after use) and officially cataloged with expendability, recoverability, repairability category (ERRC) codes XB3 and XF3. These items are categorized based upon the dollar value of their projected annual demands or frequency of demands (3:p.1-1). EOQ XB3 items are the repair parts that have a unit price of less than $10 or characteristically cannot be repaired. Upon failure or wearout, these items are removed from inventory (1:p.2-1) and discarded. EOQ XF3 items are recoverable spare items that have a unit price of $10 or more but less than $100, and have characteristics which prevent repair (1:p.2-1). These repair parts and spares are used as components of other items which can be repaired rather than discarded. These repairable items are recoverable, or exchangeable, assets. (Author)

AD-A089 457/6 PC **A04**/MF **A01**
Cornell Univ Ithaca NY Program on Science Technology and Society
Contributions to Economic Development of Science and Technology Institutions in Nigeria and Opportunities for Bilateral Cooperation.
Final rept.,
G. E. Schweitzer, and H. T. Bergh. Sep 79, 71p
Contract DOS-1751-300350

This report analyzes (a) the characteristics and capabilities of the principal institutions that comprise the science and technology infrastructure in Nigeria, (b) the potential contribution of these institutions to industrial development, and (c) opportunities for bilateral cooperation between these institutions and institutions in the United States. Two companion reports analyze similar activities in Malaysia and Colombia. A fourth report presents a cross-country comparison of some of the principal findings in the three country reports. A final report describes the methodology used in carrying out the country studies. Special attention has been given to the interactions among these institutions and between their activities and the activities of production organizations. The emphasis is on science and technology activities which relate directly and indirectly to manufacturing; to some aspects of agriculture; to the physical infrastructure needed to support industrial development, including transportation, communication, power, and water systems; to development of the natural resource base; and to the education and training of science and technology professionals and skilled labor. Science and technology directed to medicine, public health, reproductive biology, and nutrition are not considered.

AD-A089 522/7 PC **A03**/MF **A01**
Stanford Univ CA Dept of Operations Research
Solution of Stochastic Capital Budgeting Problems in a Multidivisional Firm.
Technical rept.,
Gerhard W. Schiefer, and James R. Freeland. Jun 80, 28p Rept no. TR-92
Contract N00014-76-C-0418

In this paper we formulate an iterative solution procedure for stochastic capital budgeting problems in multidivisional firms where headquarters must arrive at an optimal divisional allocation of capital assets. It is assumed that headquarters allows for its responsibility by accepting a calculated risk that periodic budgetary constraints might be violated. This attitude towards risk is modelled via the use of chance constraints. The organization of the information exchange between headquarters and divisions is basically derived from the decomposition principle but possible variations are discussed. The proposed procedure allows the consideration of divisions who are cheating while submitting divisional information to headquarters. (Author)

N73-73419/6 PC **A07**/MF **A01**
Stanford Research Inst., Menlo Park, CA.
Transfer of Technology to Selected Public Sector Areas of Concern.
Annual rept. 1 Jul 71-15 Aug 72,
Joseph G. Berke. Aug 72, 127p NASA-CR-133706
Contract NASw-1992

The National Aeronautics and Space Administration, Technology Utilization Office, established Technology Applications (TA) Teams at several interdisciplinary research institutes to actively transfer technology. Stanford Research Institute (SRI) has operated a NASA-sponsored Team for more than three years. The Team objectives are to transfer aerospace technology for the solution of public sector problems in the broad mission areas of transportation, criminalistics, and the U.S. Postal Service, and to develop and apply methodologies for achieving such transfers. Included in these broad objectives are methods for decreasing the time gap between the development and marketing of new technology and for aiding the movement of knowledge across industrial, disciplinary, and regional boundaries. The SRI TA Team has developed a methodology that includes adaptive engineering of the aerospace technology and commercialization when a market is indicated.

PB81-103731 PC **A06**/MF **A01**
Federal Highway Administration, Washington, DC. Office of Program and Policy Planning.
The State Highway Finance Outlook,
Thomas W. Cooper. Jul 78, 104p

The report describes and illustrates the decline in real highway capital investment, seeks to identify its causes and appraise the State fiscal outlook, and finally, to recommend possible actions to bring State highway revenues in line with highway costs and benefits. The report is organized into the following sections: First, a brief summary of findings and conclusions is given. Second, a background section traces developments in State highway finance including principal revenue sources, their performance and rationale. Third, the effect of related issues, such as energy conservation, on highway revenue forecasts are examined. Fourth, several remedial State revenue mechanisms are described.

PB81-104143 CP **T02**
Office of Management and Budget, Washington, DC. Federal Program Information Branch.
Catalog of Federal Domestic Assistance, 1980 (First Update).
Data file,
Robert Brown, and James Adams. Sep 80, mag tape OMB/DF-80/004
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB81-104150.

The file reflects all the textual material published in the program descriptions section of the Catalog of Federal Domestic Assistance (1980). There are 1,142 programs. In addition, a characteristics record is included for each program. These contain information extracted and coded from the textual material, for use with the accompanying documentation.

PB81-104150 PC **A04**/MF **A01**
Office of Management and Budget, Washington, DC. Federal Program Information Branch.
Catalog of Federal Domestic Assistance, 1980 (First Update),
Robert Brown. Sep 80, 65p OMB/DF-80/004A
For system on magnetic tape, see PB81-104143.

The file reflects all the textual material published in the program descriptions section of the Catalog of Federal Domestic Assistance (1980). There are 1,142 programs. In addition, a characteristics record is included for each program. These contain information extracted and coded from the textual material, for use with the accompanying documentation.

PB81-104192 PC **A02**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Economic Development Div.
Regional Councils in Metropolitan and Nonmetropolitan Areas: Some Characteristics.
Staff rept.,
J. Norman Reid. Sep 80, 17p AGESCS-800729

Recent data for regional councils in metropolitan and nonmetropolitan areas are analyzed. Metropolitan councils serve larger populations and have larger budgets, but nonmetropolitan councils spend more on a per capita basis. While nearly all are less than 15 years old, nonmetropolitan councils tend to have been formed more recently. High percentages of both metropolitan and nonmetropolitan councils are A-95 clearinghouses and receive 701 comprehensive planning grants. Metropolitan councils are more likely to be designated planners for transportation and pollution issues; nonmetropolitan councils are more likely to have economic development planning functions.

PB81-104549 PC **A02**/MF **A01**
Pennsylvania Dept. of Commerce, Harrisburg. Bureau of Travel Development.
Advertising/Public Relations Campaign to Combat the Negative Economic Impact Caused by the Nuclear Mishap at Three Mile Island, Pennsylvania.
Final rept.
Oct 80, 25p EDA-80-0143
Grant EDA-01-6-01984-40
Prepared by Ketchum, MacLeod and Grove, Inc., Pittsburgh, PA.

The Commonwealth of Pennsylvania, through the Department of Commerce, conducted a media ad-

vertising campaign to offset the negative implications and effects of the Three Mile Island incident. The emphasis of the campaign has been directed toward a friendly, all-clear image for Pennsylvania. The travel industry of the entire Commonwealth of Pennsylvania is the chief beneficiary of the proposed project.

PB81-106973 PC **A06**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
Creating Local Partnerships: The Role of the Urban Reinvestment Task Force in Developing Neighborhood Housing Services Organizations.
Mar 80, 125p HUD-0001669, HUD/PDR-539(2)
Contract HUD-H-2674

The report describes the evolution of the Urban Reinvestment Task Force and its role in developing and assisting Neighborhood Housing Services (NHS) organizations. The report provides background for a large evaluation of the Urban Reinvestment Task Force and the Neighborhood Housing Services program. This report also raised several future issues, including the continuing need of NHS's for program-oriented technical assistance; continuing support for operating and expanding NHS's and the task force's administrative environment and its effect on new programs. Tables and footnotes are provided. Appendices contain a list of NHS programs, descriptions of neighborhood preservation projects, a financial analysis of the Urban Reinvestment Task Force, and an NHS development agreement.

PB81-107914 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Subsidisation of Urban Public Transport,
P. H. Bly, F. V. Webster, and Susan Pounds.
c1980, 47p TRRL-SUPPLEMENTARY-541

Because of the general trend of increasing costs of public transport operation and higher subsidies (in some cases accompanied by falling patronage) the ECMT initiated a study of subsidization. The study, which involved 18 countries, was concerned with the aims of subsidy, the sources and conditions attached to subsidy, trends in subsidies and the effect of subsidies on patronage, fares, service levels, cost and productivity. The qualitative information concerning the sums of subsidy was analyzed in relation to the likelihood of achieving such aims, with particular reference to current experience of attempts to switch car drivers to public transport. The relationships between patronage and fares and service levels, and between subsidies and various operating factors, including costs and productivity, were studied using regression analysis and the general conclusion reached was that although the major part of the subsidy paid was reflected in reduced fares and improved service levels there may well have been some leakage into higher unit costs and manning levels. (Copyright (c) Crown Copyright 1980.)

5B. Documentation and Information Technology

AD-A089 289/3 PC **A07**/MF **A01**
Human Engineering Lab Aberdeen Proving Ground MD
Human Performance: Women in Nontraditional Occupations and the Influence of the Menstrual Cycle (A Selected Bibliography),
Linda Torsani-Fatkin, and Gerald A. Hudgens.
May 80, 146p

The bibliography is a compilation of 1485 references related to women in nontraditional occupations and the effects of the menstrual cycle on human performance. The material is divided into two major subject areas: Women's Studies/ Women in Nontraditional Occupations and Psychophysiology of the Menstrual Cycle. The time period begins around the 1930's and goes into 1979. An index of first authors is included. (Author)

AD-A089 304/0 PC **A06**/MF **A01**
Naval Postgraduate School Monterey CA
The Development of the Informational Data Base Requirements for a Reserve Training Management Decision Support System.
Master's thesis,
Robert Wilson McElmoyle. Mar 80, 119p

Since the inception in 1972 of Reserve augmentation as the primary mode of Reserve Training, the information needs of personnel responsible for the management and administration of the Reserve Training Program has steadily increased. This thesis examines the information needs of these personnel and evaluates the capability of the present Reserve Management Information Systems to meet these needs. It was found that the present reserve systems do contain useful and necessary information, however, in general, there is a need for more detailed and specific training related data that is not now available. To be useful as a Management Decision Support System for Reserve Training, additional data in the areas of correspondence course participation, Active Duty for Training performance, and advancement history and servicewide examine participation must be incorporated into the system.

AD-A089 429/5 PC **A05**/MF **A01**
Human Resources Research Organization Alexandria VA
Bibliography of Publications and Presentations during FY 1972-77. Supplement.
Dec 77, 97p
Supplement to report dated Sep 71, AD-739 924.

This supplement includes research reports issued by HumRRO from July 1971 through June 1977. It also includes some research reports prepared in earlier years which, for one reason or another, were not previously listed. Also included are publications by HumRRO staff members in professional journals and presentations at professional and other meetings. The contracts under which the research efforts were performed are identified.

AD-A089 600/1 PC **A02**/MF **A01**
Royal Aircraft Establishment Farnborough (England)
List of RAE Translations Issued during the Period January 1979 to December 1979,
Patricia O. Flint. Jan 80, 14p RAE-LIBRARY BIB-373, DRIC-BR-73994

This list covers all RAE Library Translations published during 1979 and follows Bibliography 369. Previous lists have been issued in Bibliographies 243, 249, 254, 261, 283, 313, 319, 324, 330, 353, 360, 366 and 369. (Author)

ED-179 229 Not available NTIS
Kentucky Dept. of Education, Frankfort. Div. of Instructional Services.
Guidelines for Merit Media Programs.
1979, 55p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Merit ratings for school media programs that exceed state requirements in Kentucky are explored. Standards for administrative support, facilities, resources, personnel, and programs are provided as well as procedures for conducting a self-study prior to an on-site visit. The self-study instrument which is the major part of the document covers such areas as community background, administrative support, a facilities inventory, resources available, personnel profiles, program activities, and recommended attachments. A glossary of terms completes the form.

ED-179 232 Not available NTIS
Pittsburgh Univ., PA.
Use of Library Materials: The University of Pittsburgh Study,
Allen Kent. 1979, 282p
Prepared in cooperation with Dekker (Marcel), Inc., New York. For a related document, see IR-007 887.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. Also available from Marcel Dekker, Inc., 270 Madison Ave., New York, 10016.

The findings of a study undertaken at the University of Pittsburgh in 1975 to determine the extent of materials use and the full cost of such use in the university library system are presented in this 272-page report. Intended to serve as a foundation for improved acquisitions policies, this report covers circulation and in-house use of books--circulation histories and sampling provide data for statistical comparison of use and acquisition; journal use as determined through user observation, questionnaires, and interviews; sampling methods for the six libraries with definitions of key concepts; aspects of use as related to other factors, such as duration of subscription, academic status, age, and department of user; an economic analysis of acquisition and use; and the design of a cost benefit model for library operations, which emphasizes acquisition. In further discussions of the study's findings, recommendations are made to explore further the possibilities of resource sharing, and questions are raised about implications for decision-making in library acquisition. A supplementary appendix for the journal use study discusses technical data, application of data collection methodology to other studies, and collection management.

ED-179 233 Not available NTIS
National Commission of Libraries and Information Science, Washington, DC.
The White House Conference on Library and Information Services, November, 15-19, 1979.
Nov 79, 42p
For related documents, see IR-008 002-013, and IR-008 213.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This official handbook, distributed during the conference, outlines the framework for themes, speakers, and planning, and identifies people involved in several aspects of the conference. Profiles of the 14 conference speakers are followed by a brief history of the conference and a description of the National Commission on Libraries and Information Science, including a list of members. Conference themes are listed as library and information services for personal needs, lifelong learning, organizations and the professions, governing our society, and for international understanding. Also provided are a list of members of the conference of the information community advisory committee, delegates from each state, and staff and contributers to the conference.

ED-179 234 Not available NTIS
Library of Congress, Washington, DC. Congressional Research Service.
Highlights of the White House Conference on Library and Information Services: Preconference on International Information Exchange,
Robert Lee Chartrand, and Jane Bortnick. 31 Jul 79, 40p
For related documents, see IR-008 001-013 and IR-008 213.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This report on a preconference symposium held July 31, 1979 presents recommendations developed to interpret the conference theme of library and information services for increasing international understanding. Five discussion groups were organized to consider (1) the current status of international information flow, (2) overcoming barriers to international information flow, (3) impact of current technology on international information exchange, (4) economic aspects of international information exchange, and (5) uses and users of information internationally. The reports from each group include issues, recommendations, and commentary. An overview of findings emphasizes improvement of information flow to less developed countries, coordination of U.S. information policies with world-wide developments, creation of a mechanism for coordinating U.S. information policies, improvement of domestic acquisition of foreign materials, assessment of the impact of technology on the availability of information, and improvement of standards for facilitating information flow. The transcript of a speech in which Thomas R. Pickering discusses international information policy conflicts is included.

ED-179 235 Not available NTIS
National Commission on Libraries and Information Science, Washington, DC.
Issues and Resolutions: A Summary of Pre-Conference Activities.
Sep 79, 102p
For related documents, see IR-008 001-013 and IR-008 213.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Designed to serve as a basic resource document for the White House Conference on Library and Information Services, this summary of pre-conference activities provides an analysis of the approximately 3,000 resolutions and recommendations generated by the 57 state, territorial, and topical conferences held in 1977-79 to secure input to the conference agenda from citizens; formal statements from more than 50 professional associations; and letters from concerned citizens. This analysis identified 16 goals to be discussed at the conference in the context of five conference themes--library and information services for meeting personal needs, for enhancing lifelong learning, for improving organizations and the professions, for effectively governing our society, and for increasing international understanding and cooperation. A summary of the report with brief discussions of each of these goals is followed by a detailed outline of observed issues and resolutions for action at various levels to meet the goals. The 16 implementation concerns presented in a similar format range from funding and taxation, legislation, resource sharing and networking, and physical access, to public awareness, and preservation and storage of materials. A participant list includes the dates and places for state conferences, participating organizations, and special meetings sponsored by NCLIS.

ED-179 236 Not available NTIS
Statements and Remarks Made at the White House Conference on Library and Information Services, November 15-17, 1979,
Charles Benton. Nov 79, 53p
Papers presented at the White House Conference on Library and Information Services, Washington, DC. November 15-17, 1979. For related documents, see IR-008 001-013 and IR-008 213.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Remarks made by key speakers of the conference are presented, beginning with an introduction and identification of the five major themes by Charles Benton, Chairman of the National Commission on Libraries and Information Science, and of the conference. Marilyn Gell, Executive Director of the conference, described the services of the White House Conference Information Center and its four activity areas: information on demand, conference communications, state resolutions, and physically handicapped media. The first theme speaker, Bernard Ostry (Deputy Minister of Communications to the conference), commented on increasing international understanding and cooperation, and on Canada's views of international cooperation. Francis Keppel spoke on the conference theme of lifelong learning and outlined resolutions presented in the theme discussion guide. The third conference theme--library/information services for effectively governing our society--was addressed by Senator Major R. Owens. Observations on the National Library Act and resolutions to be placed before conference delegates were made by Dr. Thomas J. Galvin, Dean of the School of Library and Information Sciences at the University of Pittsburgh, and President of the American Library Association.

ED-179 237 Not available NTIS
National Commission on Libraries and Information Science, Washington, DC.
International Information Exchange: A Theme Conference Summary. White House Conference on Library and Information Services: Pre-Conference Meetings on Special Themes, July 31, 1979,
Robert Lee Chartrand, and Jane Bortnick. Oct 79, 22p
For related documents, see IR-008 001-013 and IR-008 213.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

A brief introduction describing the planning process for the meeting, reports from five discussion groups, a summary of their findings, and conclusions are provided for a pre-conference on the theme, Library and Information Services for Increasing International Understanding and Cooperation. The nearly 100 participants, who met to exchange ideas, to clarify salient issues in this area, and to recommend program elements and priorities for the White House Conference, represented government, educational, and business groups. The five discussion groups considered the present state of international information flow, overcoming barriers to international information flow, the impact of current technology in international information exchange, economic aspects of international information exchange, and uses and users of information internationally. Twelve major issues were identified during the group deliberations, and from these, five priority issues of greatest relevance to the purpose and objectives of the White House Conference were selected: (1) coordination of U.S. information policies with worldwide developments, (2) creation of a mechanism for coordinating U.S. information policies, (3) improvement of acquisition of foreign materials for the U.S., (4) assessment of the impact of technology on the availability of information, and (5) improvement of standards for facilitating international flow.

ED-179 238 Not available NTIS
National Commission on Libraries and Information Science, Washington, DC.
Libraries and Literacy: A Theme Conference Summary. White House Conference on Library and Information Services: Pre-Conference Meetings on Special Themes, April 1-4, 1979,
Marcia Courtney Bellassai. Oct 79, 17p
For related documents, see IR-008 001-013 and IR-008 213.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Literacy being a major concern at state level preconferences, a theme conference was held to develop recommendations as to how libraries, in cooperation with other concerned agencies, can work toward solving the continuing problems of illiteracy in the U.S. Approximately 200 participants representing the library and educational communities, the government, business, and the private sector, were divided into eight discussion groups and generated 16 recommendations. This report includes a brief review of the background, the six basic tenets which provided the conceptual framework for consideration of literacy problems in relation to libraries, and a summary of the recommendations--nine for the federal level, two each for the private sector and the state level, and three for the local level.

ED-179 239 Not available NTIS
National Commission on Libraries and Information Science, Washington, DC.
New Communication and Information Technologies and Their Application to Individual and Community Use: A Theme Conference Summary. White House Conference on Library and Information Services: Pre-Conference Meetings on Special Themes, June 20-21, 1979.
Oct 79, 13p
For related documents, see IR-008 001-013 and IR-008 213.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The theme meeting on new communication and information technologies and their application to public and citizen uses and needs, which was coordinated by the National Citizens Committee for Broadcasting (NCCB), was designed as an educational experience and a working session. The 25 participants representing government, private industry, university, and citizens' groups explored the present state of communication and information technologies (hardware and software) and their current applications, as well as new applications of presently available technology for use by individuals and small community-based organizations. Following as overview presentation and discussion, participants divided into two groups to assess the information needs of individuals of the small community-based organization. Finally, participants separated into three workshops to develop community-based demonstration projects designed to educate the community on the most useful technologies for use at this level; to stimulate utilization of the technologies; to provide direct information services to the citizen/small organization; to to elicit information on utilization patterns and psychological responses of use patterns. This report summarizes the overview session, the results of both the needs assessment groups and the workshops, and the eight recommendations developed by participants.

ED-179 240 Not available NTIS
National Commission on Libraries and Information Science, Washington, DC.
Structure and Governance of Library Networks: A Theme Conference Summary. Issues for Consideration. White House Conference on Library and Information Services: Pre-Conference Meetings on Special Themes, November 6-8, 1978,
Thomas J. Galvin. Oct 79, 16p
For related documents, see IR-008 001-013 and IR-008 213.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This paper constitutes a summary of the major topics discussed by the nearly 500 librarians, information specialists, representatives of the information industry, and other interested individuals who participated in a national forum for the identification, elucidation, and discussion of issues relating to library networks, as a contribution to the creation of an action agenda on library networking for the White House Conference. Based on position papers prepared in advance and distribution to participants at the conference, comments made during six scheduled discussion sessions by members of the audience, and data gathered through a questionnaire distributed to all conference participants, the paper provides brief summaries of discussions on financing the national network; the structure of the national network and access to its services; network governance; and education, research, and development. Participants recognized the importance of a coordinated national program, as well as the needs for education, research, and development to enhance the ultimate quality of service to the individual library user. Four references are listed.

ED-179 251 Not available NTIS
National Commission on Libraries and Information Science, Washington, DC.
Federal Funding Alternatives. White House Conference on Library and Information Services: Pre-Conference Meetings on Special Themes, June 8-9 and September 14, 1978,
Alphonse F. Trezza. 1978, 21p
This summary is based on 'Prospects, Possibilities and Alternatives for Federal Support of Libraries and Information Services: Design for the 1980's: A Background Paper,' October 1978. For related documents, see IR-008 001-013 and IR-008 213.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Existing and potential federal funding programs for libraries are discussed in this special conference theme summary. The relation of library funding to the total intergovernmental grant system is explained, and eight existing federal programs are outlined that support (1) public library services, (2) interlibrary cooperation, (3) school libraries and instructional resources, (4) college library resources, (5) career training, (6) research and demonstration, (7) strengthening research libraries, and (8) college instructional equipment. Suggestions for alternative models of federal support include a revised federal role and target in funding, modification of existing funding mechanisms, and a new legislative initiative. Five references are listed.

ED-180 433 Not available NTIS
National Inst. of Education, Washington, DC. Network Development Div.

Networking and Educational Improvement: Reflections on a Strategy,
John I. Goodlad. Mar 77, 63p
Paper prepared for the Network Development Staff, School Capacity for Problem Solving Group, National Inst. of Education, Washington, DC, March 16-17, 1979. For related documents, see IR-007 656, IR-007 659, IR-007 663-666, IR-007 671, IR-007 689, IR-007 691-692.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Experiences with and studies of a formal network of 18 elementary schools--the League of Cooperating Schools (LCS)--in Southern California are described and analyzed in a narrative account, with observations, of the network's creation and maturation. This set of formal agreements between the school districts and the Research Division of the Institute for Development of Educational Activities, Inc. (IDEA) was designed to provide IDEA with access to the schools to study their self-improvement efforts, in return for human resources to assist with these efforts, and information to be derived from these studies.

ED-180 435 Not available NTIS
Royal Inst. of Tech., Stockholm (Sweden). Library.
Developing Scientific and Technological Information Services in Sri Lanka,
Stephan Schwarz. Apr 79, 123p TRITA-LIB-1093
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

A discussion of objectives for an information and documentation center in science and technology is followed by a brief survey of Sri Lanka's research and development system, and an assessment of library and information services available from a research library network, particularly those developed by the Sri Lanka Scientific and Technological Information Center (SLSTIC). Deficiencies in the system for providing scientific and technological information are diagnosed, and a program is proposed to eliminate these through foreign grants to SLSTIC and a bilateral cooperative scheme. It is emphasized that even an efficient system of information provision does not have a strong impact unless combined with an active program for development of a socio-technological infrastructure capable of assimilating and supporting the information provided. Appendices contain background information on information services in Sri Lanka.

ED-180 436 Not available NTIS
Information Resources and the Growth of Science and Technology in the United States,
David F. Hersey. 1978, 21p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This overview deals with studies bearing on the role which information on research and development plays in science and technology in the United States, discussing in general terms the nature, benefits, and problems associated with the collection, dissemination, use, and value of such information in scientific and technological growth. Studies in the following areas are briefly reviewed: (1) the perception of the national need for information, (2) the identification of sources of information and its availability, (3) the identification and satisfaction of user needs, and (4) the development of a national policy on information. A bibliography provides references for the studies and reports cited in the text.

ED-180 468 Not available NTIS
Michigan State Univ., East Lansing. Inst. for International Studies in Education.
Journals and Newsletters on Non-Formal Education and Development: A Select Annotated Bibliography.
Occasional paper no. 5,
Lynn C. Schlueter, and Jim Fritz. 1979, 42p
For related documents, see IR-007 948 and IR-007 956. Sponsored in part by Agency for International Development, Washington, DC.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This collection of 238 journals and newsletters was prepared by the Non Formal Education Information Center to provide information resources for development planners and practitioners, principally in developing nations. Annotations are in English, but some sources listed are written in French, Spanish, Portuguese, Hindi, German, Arabic, Indonesian, or Swahili. Topics covered are health, nutrition, agriculture, technological development, careers for women, housing, vocational training, literacy, environmental concerns, adult education, and family planning. Included are reports of projects, research, workshops, and training programs, and guides for development practitioners. Listings give full addresses of information sources. The final section of the bibliography lists 54 additional newsletters and journals in the Non-Formal Education Information Center.

ED-180 469 Not available NTIS
Arlington Heights Memorial Library, IL.
Legal Information Sources: An Annotated Bibliography,
Ronald C. Conner. May 79, 28p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This 25-page annotated bibliography describes the legal reference materials in the special collection of a medium-sized public library. Sources are listed in 12 categories: cases, dictionaries, directories, encyclopedias, forms, references for the lay person, general, indexes, laws and legislation, legal research aids, periodicals, and specialized materials on Illinois law. A section on specialized reference sources such as retirement, employment, environmental law, divorce, and other subjects of particular concern to citizens completes the bibliography.

ED-180 470 Not available NTIS
Alabama Library Association, University.
Manual on Intellectual Freedom.
1979, 28p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from Alabama Library Association, P.O. Box BY, University, AL. 35486 ($2.00, per copy).

Prepared by the Alabama Intellectual Freedom Committee, this practical handbook explores the concerns of librarians, especially school librarians, in the area of intellectual freedom. Included is the Library Bill of Rights, followed by an interpretation which suggests procedures for effective preparation for the confrontation with 'censors.' In addition, the ALA presents a statement of selection/acquisition policies. Appendix A contains a statement on the freedom to read and a reprint of the School Library Bill of Rights. Further interpretations of the Library Bill of Rights discuss restricted access to library materials, sexism, racism, labeling, and confidentiality of library records. The report concludes with two recommended forms: a librarian's report to the intellectual freedom committee, and a citizen's request for reconsideration of library material.

ED-180 471 Not available NTIS
INFORMEDIA, Pearl River, NY.
Mental Health,
Mary Robinson Sive. Sep 79, 22p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from INFORMEDIA, P.O. Box 1020, Pearl River, NY, 10965 ($10.00 subscription: $3.50 for single issue, prepaid). Pub. in Media Monitor, v3 n1 Sep 1979.

Instructional materials covering the major topics on mental health include 266 films, filmstrips, videotapes, slides, books, pamphlets, and other media. Of these, 118 references are appropriate for high school students, 80 for elementary students, and 68 are reference books and curriculum guides for professional use. Topics covered include general mental health, the mind, the emotions, importance of self-image, coping mechanisms, and abnormal behavior, and its treatment. Cross-references are provided, as well as a directory giving complete addresses of suppliers and a subject index.

ED-180 472 Not available NTIS
California Ethnic Services Task Force, Santa Barbara.
Multicultural/Multilingual Resources: A Vendor Directory,
Rita Torres. 1979, 233p
For related documents, see IR-007 925-926, IR-007 935, and IR-007 937.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This directory of library materials vendors is designed for use by medium-sized public libraries to assist librarians in developing collections for the multicultural, multilingual communities which they serve, and includes information on vendor profile, pre-order services provided, and customer satisfaction. The directory concentrates on four major groups in California, Asian American--of Chinese, Japanese, Korean, Philipino and Vietnamese descent, Black, Chicano/Spanish-speaking; and Native American. An ethnic vendor is anyone who supplies materials about the history and culture in English or in the languages of the particular group or groups, whether exclusively or as part of his stock. A subject index provides vendor names as sources of: (1) generalized Asian American materials in English: (2) materials in the Chinese, Japanese, Korean, Philipino, and Vietnamese languages; (3) Black materials; (4) Chicano/Spanish language materials; and (5) Native American materials.

ED-180 474 Not available NTIS
Michigan State Univ., East Lansing. Inst. for International Studies in Education.
Non-Formal Education Information Center. Program of Studies and Technical Assistance in Non-Formal Education. A Report of Progress and Recommendations for the Future and Annual Supplements,
Joan M. Claffey. 1979, 156p
Contract AID/CM/ta-C/73-22
For related documents, see IR 007 942 and IR 007 956.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This series of progress reports documents the evolution and growth of the Non-Formal Education Information Center since its inception in 1974 in terms of the people and organizations it serves, the kinds of requests it receives, and the services it provides. Illustrative examples of individuals, organizations in its international network, and requests are used throughout the reports. Observations and characteristics of general and special task requests in the first progress report are evaluated through trend analyses in the 1977 and 1978 annual supplements. Tables indicate network distribution by region and organizational affiliation. Emphasized is the increasing synergistic participation within the network, a trend supported by NFE in order to increase the awareness of, and opportunities for, the exchange of ideas and practices among people in all facets of development work. Appendices to the first progress report list organizations within the NFE network, present the 2-page NFE Information Center Brochure, and provide examples of user correspondence. Progress report supplements for 1977 and 1978 include alternatives for future courses of action.

ED-180 475 Not available NTIS
ERIC Clearinghouse on Information Resources, Syracuse, NY.
Online Searching of ERIC: Suggestions for Improvement from the Special Project,
Karen Markey. 14 Oct 79, 23p
Paper presented at the ERIC Users' Workshop, Minneapolis, MN. October 14, 1979. For related documents, see IR 007 494-495.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Based on a series of studies performed by ERIC/Information Resources staff and consultants which focused on the activities of over 40 experienced online searchers, this report offers the following suggestions for enhancing certain online retrieval system features and making improvements in ERIC vocabulary: (1) the implementation of an

online rotated descriptor display, (2) the introduction of an online rotated identifier display, and (3) the use of links between the controlled vocabulary and free text. A brief history of ERIC online services precedes a cursory look at some current ERIC searching practices. In addition, an appendix provides three overheads which compare several elements of ERIC searching with those used by three commercial bibliographic retrieval services presently marketing the ERIC database.

ED-180 476 Not available NTIS
Library of Congress, Washington, DC. Network Development Office.
The Role of the Library of Congress in the Evolving National Network.
Final rept.,
Lawrence F. Buckland, and William L. Basinski.
1978, 142p
Sponsored in part by National Commission on Libraries and Information Sciences, Washington, DC.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from Supt. of Docs.

This study of the role of the Library of Congress (LC) in the emerging national information network analyzed data gathered from 23 libraries and network organizations, and found that LC should assume leadership in network development activities by performing the major coordinating role in applying technology and acquiring funding for the technical and standards-related tasks required to link federal, multistate, state, and local systems into the national network. Other recommended activities include continuing LC's role in the creation and distribution of cataloging and authority control data, increasing its cataloging coverage, and reducing cataloging delays; establishing and maintaining an online national bibliographic database of cataloging and authority data to be accessed as a source of last resort by national network participants; continuing to create and maintain a national union catalog in machine-readable form for use by network participants; and expanding its information and training programs to inform the library community about the development and operational status of its activities and those of the network. Appendices list the study's advisory committee and the libraries and networks surveyed.

ED-180 477 Not available NTIS
San Mateo Educational Resources Center, Redwood City, CA.
SMERC Linking Agent's Handbook: Personnel, Resources, Services, Publications, Policies and More....Revised.
Katherine Clay, and Susan Long. Aug 79, 42p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This compilation of miscellaneous information about the San Mateo Educational Resources Center (SMERC) was designed as a reference tool for SMERC linking agents, i.e., SMERC-trained personnel responsible for explaining their center's information services to subscribing agencies. It contains SMERC subscription information: listings of resources and files; descriptions of the types of searches performed by SMERC as well as policies, charges, and publications; guidelines for the submission of documents; a directory of ERIC clearinghouses and related units; a glossary; a list of available microfiche readers and printers including vendors; sample ERIC and SMERC forms; and a schedule for estimating the number of microfiche needed for various document lengths.

ED-180 478 Not available NTIS
Oakland Univ., Rochester, MI. Kresge Library.
A Study of the Relationship between the Search Interview of the Intermediary Searcher and the Online System User, and the Assessment of Search Results as Judged by the User.
Final rept.,
Eileen E. Hitchingham. Aug 79, 107p
Grant OEG-007702309
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Using data gathered from 54 evaluation forms and 18 recorded interviews, this study focused on in-person users of the MEDLINE system at three search sites to determine the relationship between presearch interviews and user assessments of precision and concern for recall in online searches, and to determine differences in assessment characteristics exhibited by student and faculty users of the system. Relationships were demonstrated between the value designation and the user's concern for recall, the relevance score, and the perception of the searcher in the interview. User information-giving during the interviews was related to relevance scores for the searches, and question-asking by the searcher was related to information-giving by the user. Faculty and student users showed no significant differences in their assessments of value, relevances, satisfaction with the proportion of relevant citations retrieved, and in their perceptions of the searcher in the interview. Appendices to the study include samples of the tools used and a bibliography.

ED-180 479 Not available NTIS
California Univ., Los Angeles. Graduate School of Library and Information Science.
The Use of an On-Line Microfiche Catalog for Technical Service and Retrieval of Bibliographic Data.
/Final rept.
1 Apr 79, 249p
Grant OEG-00702302
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This report describes the development and implementation of a prototype system that integrates a microfiche catalog into an online computer system for bibliographic control. Such a system permits the storage of catalog data not yet converted to digital form, data in ideographic form, data for large numbers of little-used records, and data for use with mini- and micro-computers. The five sections of the report include (1) an overview of the project and a review of the potential for use of microform catalogs as components of computer-based systems; (2) a review of recent developments in the use of such catalogs, including a topically-arranged bibliography and a synoptic analysis of it; (3) an operator's manual which specifies how to use the equipment involved and explains how the machine programs function and interrelate; (4) a description of the programs used in demonstrating the system; and (5) a cost/effectiveness evaluation of the system.

ED-180 480 Not available NTIS
Texas State Library, Austin.
Texas Library System. State Fiscal Year 1979.
1979, 140p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This annual report consists of two major sections--the system staff and programs of the state's ten library systems, and the summary budget analysis. Information provided for each of the ten systems includes the address, telephone number, name of system coordinator of the interlibrary loan office and a directory of staff members; names and addresses of system advisory council members; a table of member libraries, showing population served, qualification, and deficient criterion (if applicable); and abstracts of system programs for SFY 1979. A statistical analysis of the budget includes system funds distribution, expenditures for collection enrichment, system film programs, continuing education and system administration programs, expenditures for headquarters staff, and system staffing. Included in the report are a state map showing the regional library systems and Texas library association districts, an introductory description of the state system (background, programs, and funding), and a staff directory of the Library Development Division of the Texas State Library.

ED-180 481 Not available NTIS
Lomond Publications, Inc., Mt. Airy, MD.
UNISIST II: Special Report,
Lowell H. Hattery. Jun 79, 14p
For a related document, see IR-007 939. Proceedings of the Intergovernmental Conference on Scientific and Technical Information for Development, Paris (France) May 28-June 1, 1979.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from Lomond Publications, Inc. Mt. Airy, MD. 21771. Pub. in Information Retrieval and Library Automation, v15 n1 Jun 79.

The major part of this report of the Intergovernmental Conference on Scientific and Technical Information (UNISIST II), held in Paris May 28-June 1, 1979, focuses on three sets of recommendations which were unanimously approved after combining the recommendations proposed by various groups and blocs: (1) recommendations to the United Nations Conference on Science and Technology for Development (UNCSTD), (2) recommendations to Unesco, and (3) recommendations to member states. In addition, the report summarizes the conference's major issues of concern, provides a brief description of conference activities, discusses the 'Politicization' of the conference, describes U.S. participation, and presents a short historical background of UNISIST, including its policies, plans, norms, and standards.

ED-180 482 Not available NTIS
Michigan State Univ., East Lansing. Inst. for International Studies in Education.
A Simple Guide to the Non-Formal Education (NFE) Information Center: How Documents are Classified, Indexed, and Cross-Referenced,
Lynn Schlueter. Oct 78, 27p
For related documents, see IR-007 942 and IR-007 948.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

An introduction to the classification principles for documents at the Non-Formal Education Information Center is given for the cataloger. The classification scheme, itemized in the first section, consists of 11 main categories such as concepts, training methods, program content, bibliographies, and countries. The next section details classification and coding procedures. The author/organization index file is then explained, with special attention given to international organizations, in-country agencies, and acronyms. The subject index file contains cross-reference cards for documents with multiple subjects. Two other small index files--the organizations arranged-by-subject file and the projects and programs file--allow the searcher to locate quickly documents referring to specific organizations or projects. Finally, the steps in preparing and filing index file cards are enumerated.

ED-180 485 Not available NTIS
Library Catalogue Automation: Cost-Benefit Factors,
Fred W. Matthews. 1979, 13p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This paper describes an automated card catalog system, developed for the Dartmouth Regional Library in Nova Scotia, which uses records of selected fixed-length fields; it is proposed as a prototype for a system meeting the needs of a public library system with a collection size of about 100,000 items. The costs of operating a catalog system based on MARC-type records and one using selected fixed-length fields are compared, and the factors which contribute to the approximately ten times lower cost of the selected system are outlined. Included in the document are a table showing the content of the record, a figure giving the page format for the author and subject catalogs, and a systems flow chart.

GKSS-79-E-1 PC **A04**/MF **A01**
Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht-Tesperhude (Germany, F.R.).
Scientific and Technical GKSS Reports of 1978.
1978, 52p
In German.
U.S. Sales Only.

This survey lists the authors and titles of all external GKSS reports (E-reports) published in 1978. Unless these are reprints of journal articles, also abstracts and/or bibliographic data are given. (Atomindex citation 11:511531)

INIS-mf-5602 PC **A02**/MF **A01**
Graz Univ. (Austria). Inst. fuer Theoretische Physik.
Work Report 1979. October 1978 - September 1979.
H. Latal. Nov 79, 25p
In German.
U.S. Sales Only.

A summary of work done at the Institute of Theoretical Physics, Graz University in the period October 1978 - September 1979. The author lists research topics of the institute, publications by staff at the institute, lectures presented by members of staff, lectures given by visting lecturers, dissertations presented to the institute and lecture courses presented at the institute. (Atomindex citation 11:518709)

N80-32273/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
NSSDC and WDC-A-R/S Document Availability and Distribution Services.
Jun 80, 13p NASA-TM-81120, NSSDC/WDC-A-R/S-80-02

Documents available from the National Space Science Data Center (NSSDC) and the World Data Center A for Rockets Satellites are described. The availability, costs, ordering procedures for documents presently available, and the procedures for obtaining future documents are given. NSSDC, established by NASA to further the widest practicable use of reduced data obtained from space science investigations and to provide investigators with an active repository for such data, is responsible for the active collection, organization, storage, announcement, retrieval, dissemination, and exchange of data received from satellite experiments. Information on sounding rocket investigations is also collected.

PB81-103228 PC **A05**/MF **A01**
Alabama State Legislature, Montgomery.
Development of Resources in Science, Engineering and Technology for The Alabama Legislature.
Final rept.,
W. G. Sherling. Aug 80, 97p NSF/RA-800161
Grant NSF-ISP78-09982

Accomplishments in improving the Legislative Technical Assistance Program (LTAP) for Alabama are reported. LTAP was established to provide liaison functions, procedures, and communication between the legislature and participating universities by developing a file of experts available at each institution, supplying members of the university coordinating committee with a copy of the inquiry log for each legislative request, and by asking them to respond when appropriate. Records on all legislative requests and responses are maintained and suggestions offered for improving the model. Recommendations include alternate ways to include professional, technical societies in the model. Appendices contain an itemized list of expenditures from SSET grant funds, a copy of the legislative resolution establishing the program, and a log of the program's activities for the 1980 Regular Session of the Alabama Legislature.

PB81-103707 PC**$10.00**/MF **A01**
National Library of Medicine, Bethesda, MD.
Permuted Medical Subject Headings, 1981.
Sep 80, 360p NLM-MED-80-04
Supersedes PB-300 499.

PERMUTED MEDICAL SUBJECT HEADINGS, 1981, is a computer-generated display of all terms, i.e., descriptors and cross references, in the alphabetic list of the National Library of Medicine's Medical Subject Headings (MeSH) for 1981, as well as all citation type, check tag, and geographic descriptors in the Annotated Alphabetic MeSH, 1981. The Permuted MeSH takes each significant word that appears in each MeSH term and then lists all the MeSH terms in which that word appears.

PB81-104218 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
A Computer Data Base System For Indexing Research Papers.
Final rept.,
Lawrence J. Kaetzel, Robert A. Glass, and George R. Smith. Oct 80, 94p NBS-TN-1123

The KGS data base system allows the indexing and retrieval of scientific research papers through the use of a minicomputer system in an interactive mode. Criteria are entered through the user's computer terminal which produces subsets of the data base in a report format as well as statistical summaries of data base elements.

PB81-104911 PC **A03**/MF **A01**
Georgia Univ., Athens. Inst. of Government.
Developing a University-Based Research Capability for the Georgia General Assembly.
Final rept.,
Delmer D. Dunn, and James E. Kundell. Jun 80, 46p NSF/RA-800127
Grant NSF-ISP78-18170

Development and evaluation of a university-based research unit to serve legislative requests for scientific and technological information are described. Significant topics designated by the legislators were researched by an interdisciplinary team composed of specialists in science and technology, public law, and public administration and finance. Mechanisms for receiving requests and disseminating results were developed. A full-time science and technology faculty member was assigned to the program to act as a liaison between the research unit and the legislature. Research projects benefited from interdisciplinary input, especially during the design phase, through informal interactions during the research, and during evaluations of the final research product. In addition to major research projects, the research unit rendered short-term technical assistance, held conferences and seminars, and encouraged publication of professional papers. The program has been considered successful by the legislators after two years of experience with it. Techniques transferable from this program to other states and recommendations for future research are presented.

PB81-105835 PC **A02**/MF **A01**
Executive Office of the President, Washington, DC. Office of Administration.
A Guide to the Publications of the Executive Office of the President. Volume 2, Issue 3.
Quarterly rept. Jan-Sep 80.
1980, 16p
See also Volume 2, Issue 2, PB80-209646.

Publications issued by the 10 agencies of the Executive Office of the President address a broad range of subjects relating to the policy-making aspects of the executive branch of the Federal Government. This issue of the Guide contains citations issued between January 1, 1980 and September 30, 1980. Publications are grouped by sponsoring EOP agency and the source of availability is given for each publication.

PB81-106528 PC **A02**/MF **A01**
Montana Office of the Lieutenant Governor, Helena.
A Professional Staff Mechanism for Increasing Integration of Scientific, Engineering, and Technological Expertise in Montana Executive Branch Policy Making (SSET),
Gerald Mueller. Oct 79, 17p NSF/RA-790426
Grant NSF-ISP78-01355

The report summarizes Montana's one-year experience in testing a professional staff mechanism for integrating scientific and technological (S & T) expertise into state energy and natural resource decisions. The mechanism utilized a professional supported by the State Science, Engineering and Technology (SSET) program as part of a three-member cabinet under the supervision of the lieutenant governor. This group dealt with a variety of functions ranging over several issues and agencies within the Executive Branch. The SSET staffer addressed state-level energy and resource policy, specific areas of energy facility siting and planning, electricity and petroleum supply, air and water quality, and solid waste problems. The program was implemented by task forces such as that on Energy, Environment and Natural Resources for which the SSET person fulfilled the staff role. Each task force consisted of the directors of each department related to the general task force subject area. Each task force reviewed both short-term and long-term programs and policies and prepared an issue paper explaining the issue and ways to resolve it.

PB81-107047 PC **A02**/MF **A01**
Nebraska State Office of Planning and Programming, Lincoln.
Nebraska Science, Engineering and Technology Program (Study Phase) - Executive Branch.
Amended final rept.
14 May 80, 16p NSF/RA-800099
Grant NSF-ISP78-02511

The main goals of this study were to examine issue identification, sources of research and funding, the need to develop a state policy, and the concept of a State Science and Technology Advisory Committee to the Governor. Workshops were held to identify issues of concern in the general areas of science, technology, and associated research and development. The specific areas of concern were agricultural development, water resources management, natural resources development, and environmental protection. The major entities conducting research and development in Nebraska were identified. Five specific recommendations were presented: (1) to establish a State Science/Technology Advisory Committee composed of volunteer citizens; (2) to investigate the possibility of linking the State's computer capacity to regional and national data sets describing R & D programs conducted elsewhere; (3) to define 'research' and to develop budget categories for it; (4) to make available scientific and technological expertise to the Governor through the use of advanced internships; and (5) to expand the planning and coordination functions of the Governor's Office.

PB81-108151 PC **A16**/MF **A01**
National Highway Traffic Safety Administration, Washington, DC. Technical Services Div.
Manpower Development: Education and Training (Revised Edition).
Subject bibliography,
William E. Tarrants, and Lois Flynn. May 80, 366p DOT-HS-805 337, SB-41

The bibliography contains abstracts of literature acquired since the establishment of the National Safety Highway Traffic Safety Administration (NHTSA) relating to manpower development, education and training in the field of highway traffic safety. It included NHTSA-sponsored curriculum and course materials, manuals, training aids, education and training guides, manpower staffing guides, and self-study workbook-cassette tape training modules; education and training reports, manuals and curriculum materials prepared by other organizations concerned with highway traffic safety; and education, training and staffing-related articles from periodicals in related fields. It is intended for use by managers and administrators concerned with manpower planning, staffing and training, instructors, course planning and development personnel and others concerned with highway traffic safety.

PB81-109548 PC **A19**/MF **A01**
Touche Ross and Co., Washington, DC.
Requirements for the Federal Inspector Management Information System. Task 3 Report.
Final rept.
31 Aug 80, 450p OFI-80/17
Contract OFI-79-16279579
See also PB80-150196 and PB80-204308.

A report on the Management Information Systems requirements of the Federal Inspector's is presented. The nine proposed subsystems of the Federal Inspector's Management Information System (FIMIS) are described in functional terms. The contents of proposed inputs, processes and outputs are detailed. This report is the third in a series that describes the Federal Inspector's management processes and management information system requirements.

PB81-110231 PC **A13**/MF **A01**
National Environmental Engineering Research Inst., Nagpur (India).
Air Quality Monitoring. A Course Manual.
Jul 78, 298p

The Refresher Course on Air Quality Monitoring is being organized for the benefit of engineers and

scientists involved in control programmes. Various aspects such as meteorology, sampling and analytical techniques for particulate and gaseous pollutants, stack sampling, automobile emissions are covered in this Course. A comprehensive coverage of these subjects should prove to be of immense use to participants as well as to others involved in such programmes.

SHR-0003513 PC **A07**/MF **A01**
Dade County Dept. of Human Resources, Miami, FL. Project SAIL.
Information and Case Coordination Unit (ICCU) for Neighborhood Service Centers. A Conceptual Design for a Client Information System.
William Green, Frank Harvey, Elaine Lhota, William Owra, and Georgia Ruiz. Jun 78, 126p
Grant 008A-76-1P0422
See also related document, SHR-0003514.

The philosophy, goals and objectives, system elements, forms and report instructions, and staff needs of the Dade County, Fla., Information and Case Coordination Unit (ICCU) for neighborhood service centers are presented. ICCU was designed to facilitate and coordinate the delivery of services to clients and their families as well as to fulfill the client data needs of management; as such, it contains screening, orientation, intake, assessment, case planning, referral, and followup and termination functions. The system is staffed by a center information specialist responsible for providing general information about the center and service providers, routing individuals to service providers, and logging individual information or routing requests. Also employed is a team of social workers who orient clients to the center, record intake data and maintain a current folder on each client, assist clients in identifying their needs or problems using a formalized set of questions, and aid clients in selecting from among service providers and facilitate their access to that provider. Efficient operation of ICCU requires completion of forms and reports specific to the system. Instructions for completing these forms (i.e., the center activity log, monthly activity report, profile and referral form, assessment and planning worksheet, management report, etc.) are included along with sample forms. ICCU staff will need training to familiarize themselves with the Center network and the ICCU systems and to expand personal and professional skills in such areas as problemsolving, counseling, grant proposal writing, and survey design. Provided are organizational hierarchies for ICCU, flow charts of ICCU activity, and definitions of terms.

SHR-0003520 PC **A12**/MF **A01**
Public Technology, Inc., Washington, DC.
Human Service Information Systems Transfer Project.
Final rept.
31 May 79, 252p
Contract DHEW-100-77-0059
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003520/ES.

A 1975 information system workshop, sponsored by the Office of Intergovernmental Systems, involved State and local government officials in the development of an HEW strategy for capacity building through the use of information systems technology. On the basis of workshop findings and recommendations, a research and demonstration project was carried out to define the information systems transfer process as revealed in the efforts of local projects. Such technology transfer has the potential for facilitating information system development at reduced cost and permitting faster implementation of needed systems. The project included a workshop to acquaint local and State officials with existing information systems which were transferable to other jurisdictions. Funds were made available to five information systems transfer projects, and technical assistance was provided to three other projects. The project demonstrated that technology transfer is a viable approach in the implementation of information systems that support planning, management, and service delivery as well as required reporting. Of equal importance is the fact that significant amounts of time and money were saved by each participating jurisdiction. An inventory also was taken to determine the status of State Title XX Social Services Information Systems (SSIS). DHEW should consider providing resources for training and deploying individuals with needed analytical skills to help local or State agencies determine whether to develop new information systems or use existing ones. In addition, DHEW can provide the money required for systems development and third - party consultants. Charts, tables, and appendices are provided for some chapters. (Portions of this report are not fully legible.)

SHR-0003592 PC **A05**/MF **A01**
Human Services Coordination Alliance, Inc., Louisville, KY.
Human Services Information System: Procedures for the Acquisition and Maintenance of Secondary Data Bases.
G. Lawrence Atkins. 30 Jun 79, 79p
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003592/ES.

This report examines how the Human Services Coordination Alliance of Louisville and Jefferson County, Ky., responded to the decisionmaking needs created by the conversion of several Federal categorical grant programs into block grants. These block grants vested planning and allocation decisionmaking authority in the hands of State and local officials. The development of a consortium information system, known as the human services information system, has improved the accessibility for planners and managers to acquire information needed for program planning, grant proposal writing, and management. The system has incorporated existing data bases into a shared data base available to consortium participants. So far, this system has produced reports on statistical profiles of small areas, documentation of trends in the development of social conditions and the delivery of human services, identification of factors related to the development of social conditions, and comparisons of the demand for and the use of services. The development of such a system must be based on an inventory of existing data bases for the purpose of screening and prioritizing data bases for incorporation into the shared data base. Access to the data base must take into account the need to protect the confidentiality and privacy of information. Special attention has to be focused on data base maintenance and proper use. A sample of an agreement between the Human Services Coordination Alliance and a participating agency; a summary of the principles and procedures related to privacy, confidentiality, and security; a list of the system's data bases; and a chart showing updated contracts and procedures through June 1979 are appended.

5C. Economics

AD-A089 458/4 PC **A09**/MF **A01**
George Washington Univ Washington DC Graduate Program in Science Technology and Public Policy
An Analysis: U.S. Participation in the OECD Committee on Scientific and Technological Policy (CSTP),
John M. Logsdon, Charles V. Kidd, and Albert H. Teich. Nov 79, 198p

The current work of OECD's Committee for Scientific and Technological Policy (CSTP) is grouped into five broad Themes plus a category of horizontal studies. The central focus of this report on Theme I, 'Science, Technology and Economic and Industrial Policy,' which encompasses a wide range of technology issues that relate to economic policy and go to the heart of the CSTP raison d'etre. The United States has attached low priority to activities under Theme II, 'Government Policies and the Strengthening of the Research System.' In contrast, there is considerable interest and active participation in projects under Theme III, 'Information, Computer and Communication Policy,' which deals with subjects high on the U.S. policy agenda. Theme IV, 'Scientific and Technological Relations with Developing Countries' has involved consultation among the OECD members on preparations for the U.N. Conference and Science and Technology for Development held in Vienna in August 1979. U.S. Participation on Theme V, 'Science and Technology Indicators' is provided by the National Foundation which is deeply interested in improving these important comparative data. Horizontal activities relating to OECD-wide questions or those cutting across the individual themes complete the CSTP program.

AD-A089 595/3 PC **A03**/MF **A01**
DePauw Univ Greencastle IN
Intergenerational Political Economy (A Game Theoretic Model of How to Glue the Generations Together),
Martin Shubik. 29 Jul 80, 37p Rept no.
DISCUSSION PAPER-557
Contract N00014-77-C-0518

The purpose of this paper is to show that if reasonable care is taken in well-defining the types of games of strategy which arise naturally from considerations of the multigenerational aspects of any economy; then many different plausible explanations of intergenerational links will all be consistent with a stationary economy with intergenerational transfers of wealth. Which of the models (or blends of the models) is the best appears to be more of an empirical rather than theoretical question.

DIB-80-11-500 PC**$10.00**/MF **A01**
Ronai Y. Asociados S.R.L., Caracas (Venezuela).
Venezuelan Market Study on Plastics and Rubber Industry Production Equipment.
Foreign market survey rept. (Final).
1 Aug 80, 85p
U.S. sales only for 8 months. Available to foreign addressees in Jun 81.

The total 1980 Venezuelan market for plastics and rubber industry equipment and raw materials is projected to reach $413 million, up from $334 million in 1978 (see Table 1) - for an average growth rate of 11% for each of the last 2 years. However 89% of 1980's projected sales will come from raw materials - while equipment is projected to total only $46.8 million.

N80-32297/7 PC **A03**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France). Div. Systemes Balistiques et Spatiaux.
Example of a Policy Aimed at Increasing the Value of Spin-Offs from Space Technology in Other Fields Exemple d'Une Politique de Valorisation de Retombes Technologiques Spatiales dans d'Autres Domaines.
D. G. Compard. 1980, 36p SNIAS-801-422-101
Text in French. Presented at Intern. Colloq. On the Econ. Effects of Space and Other Adv. Technol., Strasbourg, 28-30 Apr. 1980.

Emphasis is given to applications derived from space systems, launching devices and ballistic motors. The underlying philosophy is presented together with the objectives sought. These applications concern energy (storage facilities, off-shore oil installations, nuclear and solar power), medicine, vehicle breaking systems, new materials, some specific technologies (extraction of metals, chemical synthesis, drilling), and safety (particularly in aeronautics. Special studies including the design and demonstration of systems for the chemical and petroleum industries, as well as software systems for ships and other proposes are also described. Some concrete examples are treated. Economics aspects are discussed together with expected developments.

N80-32301/7 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France). Div. Systemes Balistiques et Spatiaux.
An Attempt to Estimate the Economic Effects in the Choice of Space Technology Spin-Offs Tentataive d'Estimation des Effets Economiques dans les Choix de Retombes Technologiques Spatiales.
J. M. Contant. 1980, 9p SNIAS-801-422-107
Text in French. Presented at Intern. Colloq. On the Econ. Effects of Space and Other Adv. Technol., Strasbourg, 28-30 Apr. 1980.

The use of multicriteria methods to rationalize the choice of the particular technologies to be developed is presented. A methodical approach emphasizing the importance of economic, financial, com-

mercial, and technological considerations is developed. It is concluded that some feedback is necessary, if subjective influences on the appreciation of the economic effects ensuing are to be overcome. The accounting services existing today in companies and organisations are not well adapted to conduct the type of analysis necessary.

PB80-928010 PC **E02**/MF **A01**
Central Intelligence Agency, Washington, DC.
The OECD Steel Industries: Difficult Years Ahead.
Research paper.
Oct 80, 21p ER-80-10513
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-928000.

The paper examines the major factors that will shape the developed country steel industries in the years ahead. Most attention has been given to the medium term, but likely trends in the longer run also have been suggested. The paper focuses only on the OECD chiefly because the net demand of the LDCs and the Communist countries for steel from the developed countries is relatively stable.

PB81-103947 PC **E03**/MF **E03**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
Market Substitution Models and Economic Parameters.
Final rept.,
Bernard I. Spinrad. c1980, 31p RR-80-28

Market penetration by new technologies is an established fact. The curves of penetration obey simple mathematical rules and fit past experience very well. However, it has not been possible to argue rigorously the future market penetration would follow the same rules, because a theoretical basis for these rules was lacking. In a 1977 IIASA report, it was proposed such a basis for centrally planned economies; it followed from detailed consideration of their investment practices. Thus, there remained a need for a model that would be heuristically reasonable for market economies. This report explores two such models. The work reported here provides a basis for including market penetration considerations in the research activities of the IIASA Energy Systems program. (Copyright (c) 1980, International Institute for Applied Systems Analysis.)

PB81-104556 PC **A06**/MF **A01**
National Council for Urban Economic Development, Washington, DC.
An Introduction to the Economic Development Planning Process.
Final rept.
Jul 80, 115p EDA-ERD-80-163
Grants EDA-99-7-13394, EDA-OER-586-G-79-12

The report provides an overview of the economic development planning process. While the report was written for planners, it provides useful information for anyone interested in the field of economic development planning. The report is divided into four chapters: (1) Operating Within the Local Setting outlines the context in which the economic development planner must operate. It discusses who must be involved in the planning process and how different organizational structures affect the planner; (2) Identifying Local Needs and Goals describes the information needed to make an initial description and assessment of the local economy; (3) Developing a Strategy lists the basic elements of a comprehensive economic development strategy. The chapter suggests basic policy choices a city must make before designing a strategy and discusses the various activities a strategy can include; (4) Designing and Selecting Programs and Projects explains how to design programs and select projects to achieve the development goals. The section describes various analytic techniques, such as impact analysis, feasibility studies and cost-benefit analysis.

PB81-104671 PC **A05**/MF **A01**
Smith (Wilbur) and Associates, Columbia, SC.
A Feasibility Study to Evaluate the Market for Bottled Water.
Oct 80, 83p EDA-80-0148
Grant EDA-04-06-01853
Prepared for Eastern Band of Cherokee Indians.

The feasibility study was undertaken with the express purpose of evaluating the market for bottled water products. The Eastern Bank of Cherokee Indians examined the natural water resources of the reservation and its projected uses as an economic benefit to the tribe. This report mainly focuses its attention on facility and equipment requirements and production levels to sustain this economic development activity. The recommended method of distributing Cherokee Bottled Water is through retail outlets and while retail sales are capturing an increasing share of the market.

PB81-105009 PC **A18**/MF **A01**
Charles River Associates, Inc., Boston, MA.
Innovation, Competition, and Government Policy in the Semiconductor Industry.
Final rept.
Sep 80, 403p NBS-GCR-ETIP-80-91
Contract NBS-78-3600

Federal policy with respect to technological change is currently a major issue due to the relationship of technological change to international competition, inflation, and economic growth. This volume presents a case study of the semiconductor industry that applies a framework for examining the impact of federal policy on innovation, competition, and performance in technology-based industries. Analyzing the actual and potential effects of government policy requires an understanding of the fundamental forces that shape industry behavior. To provide this understanding, the study presents detailed analyses of the environment and technology of the semiconductor industry, of innovative behavior by semiconductor firms, of strategies and competitive behavior, and of the performance of industrial firms and the industry as a whole. These analyses are the subject of Chapters 2, 3, 4, and 5, respectively. Chapter 1 presents an overview of the effects of government policies and Chapter 6 analyzes the impact of procurement, R&D funding, antitrust, trade, tax, and manpower policies on the semiconductor industry.

PB81-105132 MF **A01**
Department of Commerce, Washington, DC.
Business America - The Journal of International Trade, Volume 3, Number 21, October 20, 1980.
Bi-weekly pub.
20 Oct 80, 54p
See also Volume 3, Number 19, PB80-226434.
Paper copy available from Supt. of Docs.

Contents:
Trade policy in the years ahead;
Which way the business--Government partnership;
Export credits in the 1980's;
Commerce's export programs for the 1980's;
Service exports--brightening the '80's;
Trends and directions in U.S. export controls;
U.S. consuls' views hit home--100 years later;
Economic highlights;
Business outlook abroad;
Worldwide business opportunities.

PB81-105157 PC **A10**/MF **A01**
Bureau of Economic Analysis, Washington, DC. Regional Economic Measurement Div.
Local Area Personal Income, 1973-78. Volume 1. Summary, Including Methodology and Classification of SMSA's and BEA Economic Areas.
Jul 80, 208p BEA-REM-80-04
See also report dated Jul 77, PB-270 880, and Volume 2, PB81-105165.
Also available in set of 9 reports PC E99, PB81-105140.

The report includes methodology and classification of SMSA's and BEA Economic Areas. It shows total and per capita personal income by place of residence, personal income by type of payment, and labor proprietors' income by major industry and place of work. Data for all States, BEA Economic Areas, and Standard Metropolitan Statistical Areas are presented.

PB81-105165 PC **A04**/MF **A01**
Bureau of Economic Analysis, Washington, DC. Regional Economic Measurement Div.
Local Area Personal Income, 1973-78. Volume 2. New England Region.
Jul 80, 56p BEA-REM-80-05
See also Volume 1, PB81-105157, and Volume 3, PB81-105173.
Also available in set of 9 reports PC E99, PB81-105140.

The report shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data are shown for counties and Standard Metropolitan Statistical Areas in these New England Region states: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

PB81-105173 PC **A05**/MF **A01**
Bureau of Economic Analysis, Washington, DC. Regional Economic Measurement Div.
Local Area Personal Income, 1973-78. Volume 3. Mideast Region.
Jul 80, 90p BEA-REM-80-06
See also Volume 2, PB81-105165, and Volume 4, PB81-105181.
Also available in set of 9 reports PC E99, PB81-105140.

The report shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data are shown for counties and Standard Metropolitan Statistical Areas in these Mideast Region States: Delaware, District of Columbia, Maryland, New Jersey, New York and Pennsylvania.

PB81-105181 PC **A08**/MF **A01**
Bureau of Economic Analysis, Washington, DC. Regional Economic Measurement Div.
Local Area Personal Income, 1973-78. Volume 4. Great Lakes Region.
Jul 80, 157p BEA-REM-80-07
See also Volume 3, PB81-105173, and Volume 5, PB81-105199.
Also available in set of 9 reports PC E99, PB81-105140.

The report shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data are shown for counties and Standard Metropolitan Statistical Areas in these Great Lakes Region states: Illinois, Indiana, Michigan, Ohio, and Wisconsin.

PB81-105199 PC **A09**/MF **A01**
Bureau of Economic Analysis, Washington, DC. Regional Economic Measurement Div.
Local Area Personal Income, 1973-78. Volume 5. Plains Region.
Jul 80, 197p BEA-REM-80-08
See also Volume 4, PB81-105181, and Volume 6, PB81-105207.
Also available in set of 9 reports PC E99, PB81-105140.

The report shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data are shown for counties and Standard Metropolitan Statistical Areas in these Plains Region states: Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota.

PB81-105207 PC **A15**/MF **A01**
Bureau of Economic Analysis, Washington, DC. Regional Economic Measurement Div.
Local Area Personal Income, 1973-78. Volume 6. Southeast Region.
Jul 80, 335p BEA-REM-80-09
See also Volume 5, PB81-105199, and Volume 7, PB81-105215.
Also available in set of 9 reports PC E99, PB81-105140.

The report shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data

are shown for counties and Standard Metropolitan Statistical Areas in these Southeast region states: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia.

PB81-105215 PC **A07**/MF **A01**
Bureau of Economic Analysis, Washington, DC. Regional Economic Measurement Div.
Local Area Personal Income, 1973-78. Volume 7. Southwest Region.
Jul 80, 134p BEA-REM-80-10
See also Volume 6, PB81-105207, and Volume 8, PB81-105223.
Also available in set of 9 reports PC E99, PB81-105140.

The report shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data are shown for counties and Standard Metropolitan Statistical Areas in these Southwest Region states: Arizona, New Mexico, Oklahoma, and Texas.

PB81-105223 PC **A05**/MF **A01**
Bureau of Economic Analysis, Washington, DC. Regional Economic Measurement Div.
Local Area Personal Income, 1973-78. Volume 8. Rocky Mountain Region.
Jul 80, 89p BEA-REM-80-11
See also Volume 7, PB81-105215, and Volume 9, PB81-105231.
Also available in set of 9 reports PC E99, PB81-105140.

The report shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data are shown for counties and Standard Metropolitan Statistical Areas in these Rocky Mountain Region states: Colorado, Idaho, Montana, Utah, and Wyoming.

PB81-105231 PC **A05**/MF **A01**
Bureau of Economic Analysis, Washington, DC. Regional Economic Measurement Div.
Local Area Personal Income, 1973-78. Volume 9. Far West Region, Including Alaska and Hawaii.
Jul 80, 89p BEA-REM-80-12
See also Volume 8, PB81-105223.
Also available in set of 9 reports PC E99, PB81-105140.

The report shows total and per capita personal income by place of residence; personal income by type of payment; and labor and proprietors' income by major industry and place of work. Data are shown for counties and Standard Metropolitan Statistical Areas in Alaska, Hawaii, and these Far West Region states: California, Nevada, Oregon, and Washington.

PB81-105314 PC **A15**/MF **A01**
Office of the United States Trade Representative, Washington, DC.
Study of U.S. Competitiveness.
15 Jul 80, 340p

The study reviews the long-term trade performance of the United States through 1979, and assesses the claim that the United States has lost its competitiveness in overseas markets. This analysis is carried out at both an aggregated level and at a highly detailed level. The study also examines the key factors affecting the competitiveness of U.S. exports in world markets including: changes in capital and skilled labor resources, investment, technological innovation; productivity and unit labor costs, tariff and nontariff barriers to U.S. exports, foreign investment and technology transfer, tax measures, energy and other factors, including labor-management relations, and the role of engineering and other services in the export of capital goods.

PB81-106635 PC **A05**/MF **A01**
Florida Dept. of Natural Resources, Tallahassee.
Fisheries Extension and Marketing Services Program.
Completion rept. Jul 75-Sep 78.
Jan 79, 83p NOAA-79012501
See also COM-75-11327.

In April, 1975, it was determined that the Florida Department of Natural Resources would undertake a Fisheries Extension and Marketing Services Project which would last three years. The project became effective July 1, 1975, and was completed September 30, 1978. Funding of the project was supplied by federal as well as state funds. The objectives of the project were twofold. The first was to conduct an extension program designed to teach professional foods people and food educators in such areas as: fish cookery techniques; proper procedures in purchasing, handling, storage, and preparation; and nutritional value of seafood. The second objective was to maintain and expand demand for fishery products (with special emphasis on underutilized species).

PB81-106916 PC **A02**/MF **A01**
Urban Inst., Washington, DC.
Owner-Occupant Housing and Life Cycle Saving,
C. Duncan MacRae. Jul 80, 24p 1116-07, HUD-0001654
Contract HUD-H-2162R

The report examines how housing decisions are affected by stages in the life cycle. The resulting theory links current and future housing decisions and explores the role of accumulated wealth in these decisions. How the resulting theory supports or qualifies the assumptions of The Urban Institute Housing Model is indicated, as well as is the feasibility of incorporating the theory into the U.I. Model.

PB81-106932 PC **A10**/MF **A01**
Urban Inst., Washington, DC.
The Administrative Feasibility of a Mandatory Program for Residential Energy Conservation,
Robert Dubinsky, and Joel Rosenblatt. Jun 80, 216p 1344-02, HUD-0001659
Contract HUD-H-2882

This report is one of four Urban Institute reports evaluating the feasibility of a mandatory program which requires that residential dwellings meet an energy standard at the time the properties are sold or exchanged. It covers the feasibility and cost of various administrative options which might be implemented to carry out such a mandatory program nationwide.

PB81-106957 PC **A09**/MF **A01**
Urban Inst., Washington, DC.
The Impact of Residential Energy Conservation Standards on Households,
Michael Andreassi, Lorene Yap, and Olson Lee. Jun 80, 181p 1344-05, HUD-0001661
Contract HUD-H-2882

This report is one of four Urban Institute reports evaluating the feasibility of a mandatory program which requires that residential dwellings meet an energy standard at the time the property is sold or transferred. Three illustrative energy-efficiency standards (low, medium, high) which represented different levels of conservation were developed.

PB81-106965 PC **A04**/MF **A01**
Urban Inst., Washington, DC.
The Effects of Energy Conservation Standards on Housing Markets,
John C. Weicher. Jun 80, 75p 1344-06, HUD-0001662
Contract HUD-H-2882

This report analyzes the housing market impacts of mandotory energy conservation standards for owner-occupied homes, focusing on standards for existing homes imposed at the time of sale. Beginning with an analysis of the effects of energy price increases in the absence of any standards, the paper then lists several ways in which standards might affect the housing market and investigates these issues both theoretically and quantitatively.

PB81-106999 PC **A02**/MF **A01**
Neighborhood Reinvestment Corp., Washington, DC. Neighborhood Preservation Projects Div.
A Partnership Approach to Neighborhood Commercial Reinvestment,
Evelyn Brown, Robert Rosero, Meg Armstrong, and Janet Gordon. Jun 80, 22p HUD-0001679
Prepared in cooperation with Office of the Comptroller of the Currency, Washington, DC. Community Development Div.

This first report of the Commercial Reinvestment Task Force, established in 1978 by President Carter as one element of the Administration's Urban Policy program, summarizes the efforts of the Task Force to date, describes the information gathered, and outlines a new approach to commercial reinvestment. The cities of Portland, OR., and Baltimore, MD. were selected for a Phase I pilot program to analyze the potential of the partnership approach and to help those projects strengthen their organizations and increase private reinvestment. This approach, which will be tested on a limited basis, stresses the importance of support by residents, merchants, and property owners; participation by local government officials; and provision of conventional financing by lenders to area businesses. The pilot approach will create an organization to make development decisions, will initiate a market analysis and program with clear development objectives, and will hire a professional staff. In addition, Task Force member agencies can offer technical assistance, loan guarantees, development grants, and financing information for lenders.

PB81-107906 PC **A03**/MF **A01**
American Embassy, Tokyo (Japan).
Japan Market Information Report. Bibliography: English-Language Business Publications in Japan.
Jul 80, 27p

The bibliography lists English-language business publications which the Embassy believes useful to U.S. businessmen interested in the Japanese market. It contains publications which are published in Japan by private firms as well as by Japanese government agencies. Each entry provides title, publisher and address, frequency, month of publication, the latest price (subject to change), and a brief annotation. For further information or purchase, please contact the publisher directly.

PB81-108029 PC **A02**/MF **A01**
Centaur Associates, Inc., Washington, DC.
Analysis of the North American Cruise Industry. Executive Summary.
Final rept.,
Marilyn J. Schule. Oct 80, 13p MA-RD-960-81008
Contract MA79-5AC-00037
See also PB821-108037.
Also available in set of 3 reports PC E10, PB81-108011.

The study was designed to determine the economic characteristics of the cruise market and to assess potential for American flag involvement in the U.S. cruise industry. The report presents economic/market information on the cruise industry, a market analysis of existing supply and demand, a profile of passenger demographics and a projection of industry trends to 1990.

PB81-108037 PC **A07**/MF **A01**
Centaur Associates, Inc., Washington, DC.
Analysis of the North American Cruise Industry.
Final rept.,
Marilyn J. Schule. Oct 80, 150p MA-RD-960-81009
Contract MA79-5AC-00037
See also PB81-108029, and PB81-108045.
Also available in set of 3 reports PC E10, PB81-108011.

The study was designed to determine the economic characteristics of the cruise market and to assess potential for American flag involvement in the U.S. cruise industry. The report presents economic/market information on the cruise industry, a market analysis of existing supply and demand, a profile of passenger demographics and a projection of industry trends to 1990. Detailed market, cost, schedule and pricing competition factors for Hawaiian cruises are also presented.

PB81-108045 PC **A04**/MF **A01**
Centaur Associates, Inc., Washington, DC.
Analysis of the North American Cruise Industry. Appendices.
Final rept.,

Marilyn J. Schule. Oct 80, 68p MA-RD-960-81010
Contract MA79-5AC-00037
See also PB81-108037.
Also available in set of 3 reports PC E10, PB81-108011.

The study was designed to determine the economic characteristics of the cruise market and to assess potential for American flag involvement in the U.S. cruise industry. The report presents economic/market information on the cruise industry, a market analysis of existing supply and demand, a profile of passenger demographics and a projection of industry trends to 1990. Detailed market, cost, schedule and pricing competition factors for Hawaiian cruises are also presented.

PB81-108425 PC **A08**/MF **A01**
Research and Planning Inst., Inc., Cambridge, MA.
Case Studies Examining the Role of Government Research and Development Contract Funding in the Early History of High Technology Companies.
Final rept.,
Judith H. Obermayer. Jul 80, 161p
Contract SBA-2633-OA-79

The project was to prepare case studies of the early stages of the evolution and growth of thirty-three currently successful, innovative high-technology companies. The primary source of information was an interview with a founder of the company. Of particular importance were examinations of the factors integral to their commercial success and the role, if any, played by government research and development contracts in the company histories. The study documents the enormous technological contribution made by these companies toward the solution of our nation's social and economic problems. Their ability to create jobs is significant, even among the older, mature companies that normally produce few new jobs. The availability of government R&D contracts was frequently an important incentive for companies' formation and a key factor in early survival.

PB81-110165 PC **A08**/MF **A01**
Maine Univ. at Portland-Gorham. Inst. for Innovative Enterprise.
Incentives for Innovation: A Study of Innovation in Maine Industry,
H. Nelson Upthegrove, and Rosalyne S. Bernstein. 30 Nov 76, 169p NSF/RA-761863
Grant NSF-RD1-74-20264

Factors which stimulate or inhibit innovation in the economically underdeveloped State of Maine are identified. Interviews were conducted among the state's manufacturing and non-manufacturing industries. A data base was established to: (1) review research on the factors essential to innovation and technology transfer; (2) ascertain the extent to which a sample of Maine industries invest nonfunded dollars in research and development and/or new technology; (3) determine the extent and character of management inhibition toward innovation; and (4) examine factors responsible for low levels of innovation in Maine's industry.

PB81-110843 PC **A06**/MF **A01**
National Bureau of Standards, Washington, DC.
Model State Laws and Regulations.
Annual rept.,
Harold F. Wollin. 1980, 107p NBS/HB-130
Supersedes PB80-142425.

The Handbook is the first of its kind produced for the National Conference on Weights and Measures. It is a compilation of the latest Model State Laws and Regulations adopted by the NCWM. The compilation itself was approved by the 64th National Conference of Weights and Measures in 1979 and is recommended to the States for promulgation. Recommended changes to the Handbook upon adoption by the NCWM will be made a part of subsequent annual editions of the Handbook.

SHR-0003514 PC **A05**/MF **A01**
Dade County Dept. of Human Resources, Miami, FL. Project SAIL.
Cost Accounting System for Neighborhood Service Centers. Conceptual System Design.
William Green, Frank Harvey, Elaine Lhota, William Owra, and Georgia Ruiz. Jun 78, 93p
Grant 008A-76-1P0422
See also related document, SHR-0003513.

A conceptual system design for a uniform cost accounting system for Dade County, Fla., Neighborhood Service Centers is presented. The system is designed to provide administrators with proper and fair methods for allocating operating costs, capital outlay costs, and ancillary costs to the appropriate service providers located in a common facility. To demonstrate the use of this conceptual system, a specific human services center, Coconut Grove Center, is described in terms of its historical costs and center allocation patterns. The proposed allocation of operating costs and capital outlay costs basically uses square footage as the major unit, in both theoretical and practical areas. The design assumes that agencies will share a copying machine, purchase their own autotron or use single form recordkeeping to account for use of copy machine and paper, and, in large centers, provide for their own telephones. Smaller agencies might opt for a central switchboard, but a long - distance telephone log would have to be kept by the central operator to assure fair billing to the providers. Monthly telephone charges would include equipment rental, long distance calls, installation, and monthly charges. Monitoring reports would be kept regarding rental, copy machine, and monthly telephone reporting by providers. Forms for the various reports, calculation procedures for square footage of rent and provider space needs, and a glossary of terms are provided.

5D. History, Law, and Political Science

AD-A089 201/8 PC **A03**/MF **A01**
Army War Coll Strategic Studies Inst Carlisle Barracks PA
Soviet Policy Toward Ba'athist Iraq, 1968-1979.
Strategic issues research memo.,
Robert O. Freedman. 10 Jun 80, 40p

This memorandum assesses the success of Soviet policy toward Iraq. The author first examines Soviet policy toward the entire Middle East, since Soviet policy toward Iraq is very much a component of its overall policy toward the region. In addition, he considers the nature of the Ba'athist regime in Iraq, since many of the successes achieved and problems encountered by the USSR in its dealings with the Iraqis stem from the rather singular nature of the Iraqi regime which has been beset by serious domestic and foreign problems since it came to power. The paper finally examines the evolution of the Soviet-Iraqi relationship from the coup d'etat which brought the Ba'athists back to power in July 1968 until the present, and draws some conclusions about the success of Soviet foreign policy during that time. (Author)

AD-A089 202/6 PC **A03**/MF **A01**
Army War Coll Strategic Studies Inst Carlisle Barracks PA
The Soviet Union and Asean.
Strategic issues research memo.,
Thomas L. Wilborn. 1 Apr 80, 36p

This memorandum considers whether Soviet foreign policy in the ASEAN countries has been a success or failure. The author contends that after Vietnam invaded Kampuchea with Soviet support--and the ASEAN area assumed greater importance to Moscow than ever before--whatever influence the USSR had in ASEAN capitals was negated. ASEAN countries forcefully have opposed Vietnamese and Soviet policy toward Kampuchea and the refugee problem, and indirectly have supported China. The author believes that Soviet strategy to contain China requires at least ASEAN neutrality, and that Soviet moves to reverse current trends can be expected. (Author)

AD-A089 259/6 PC **A15**/MF **A01**
Naval Postgraduate School Monterey CA
Arms Transfer and Security Assistance to the Korean Peninsula, 1945-1980: Impact and Implications.
Master's thesis,
Richard P. Cassidy. Jun 80, 345p

Since the Korean War, the United States, the Soviet Union, and the People's Republic of China have sought to maintain a peaceful stability on the Korean peninsula. Their strategies oriented toward maintaining such a stability has been based on three major factors: economic aid, military assistance, and, in the case of the United States, a continued presence of American military forces. The phenomena of arms transfers and security assistance has played a major role in the overall nation state development of both Koreas; moreover, it has resulted in supplier entanglement for the three major suppliers. From the latter 1960s, these major suppliers have displayed great interest in maintaining a status quo, while the Koreans have moved toward limited independence by developing indigenous arms industries, expanding their defense budgets, and continuing an upward economic mobility. A consequence of these developments has been a reduction in the ability of the suppliers to control or influence their client states and a possible future threat to the status quo.

AD-A089 301/6 PC **A12**/MF **A01**
RAND Corp Santa Monica CA
The Dynamics of Factions and Consensus in Chinese Politics: A Model and Some Propositions.
Interim rept.,
Lucian W. Pye. Jul 80, 266p Rept no. RAND/R-2566-AF
Contract F49620-77-C-0023

A Study of the dynamic of factionalism in Chinese politics: the tension between the imperative of upholding consensus, and the need of officials to seek the security of networks of personal relationships that create counterconsensus factions. These networks are more sensitive to career and power considerations than to ideology, geography, or policy issues. The psychological and cultural roots of factional behavior affect styles of decisionmaking and implementation (causing exaggerated cycles of bureaucratic paralysis, compulsive activity, and again paralysis), modes of political communication (the powerful must use code words, while the weak can be explicit), and a widespread, self-fulfilling belief that any form of intra-elite disagreement will endanger the stability of the political system. (Author)

AD-A089 323/0 PC **A04**/MF **A01**
Army War Coll Carlisle Barracks PA
The Potential for Conflict in Latin America: A Cross-National Study.
Study project rept.,
Max G. Manwaring. 16 May 80, 62p

This paper has one primary and five secondary objectives. The major purpose is to examine the potential for conflict in Latin America--with particular emphasis on the Andean countries. The secondary objectives are to: (1) inject discipline and reasoned operational definitions into a generally 'fuzzy' area of study, and to contribute to a theoretical-empirical elucidation of the contemporary power equation; (2) outline Latin American security fears; (3) measure the relative vulnerability of the various Latin American countries to overt and international systemic aggression; (4) determine the apparent direction in which the relative vulnerabilities of the countries of this region are moving; and, finally, (5) suggest some implications and recommendations for United States policy in the Hemisphere. Through the fusing of data with theory at this macro-level, one can better understand the realities of international conflict in the contemporary world; determine general patterns; and, hopefully, establish an effective reference point in the formulation of broad policy. (Author)

AD-A089 324/8 PC **A03**/MF **A01**
Army War Coll Carlisle Barracks PA
Strategic Options of Japan under the Tri-Polar Structure in Northeast Asia.
Study project rept.,
Hideya Aoto. 2 Jun 80, 38p

Under the changing structure of Tri-polar Powers in Northeast Asia, Japan faces mounting pressure from outside and inside to step up its military strength. In this paper the author analyzes the strategy of the United States, Soviet Union, China,

and Japan; examines Japan-US relations; and seeks several strategic options for Japan's security policy and defense strategy. The conclusion is to reshape and strengthen the Japan-US bilateral treaty, and put the emphasis on improving the Japanese ground force as well as the maritime force. (Author)

AD-A089 399/0 PC **A03**/MF **A01**
Army War Coll Strategic Studies inst Carlisle Barracks PA
The Soviet Union and Southern Africa.
Strategic issues research memo.,
Daniel S. Papp. 22 Apr 80, 36p

This memorandum considers Soviet policy toward the Southern African region as a whole. The author analyzes such issues as the objectives which the USSR seeks to achieve in the region; the instruments of policy which the Soviet Union employs; the degree of success the Soviets have achieved in obtaining their objectives; the prognosis for future Soviet policy; and implications which may be drawn for the United States. (Author)

AD-A089 400/6 PC **A02**/MF **A01**
Army War Coll Strategic Studies Inst Carlisle Barracks PA
On Soviet Asian Policy: A Commentary.
Strategic issues research memo.,
Thomas W. Robinson. 30 Jun 80, 18p

This memorandum evaluates whether Soviet Asian policy has been a success or a failure. The author argues that the USSR's policy itself is largely responsible for the fact that the majority of the important Asian states (including China and Japan) have lined up against it, for the wariness of many of the rest (e.g., ASEAN) and for the crudely utilitarian nature of relations that states such as India, Vietnam, and North Korea have with Moscow. He continues that the upshot has been that the Soviets have been frozen out of the first group, pushed around by the second, and taken advantage of by the third. He concludes that the Soviets have two hopes for their future in Asia: an increase in the number of 'trouble spots,' permitting Moscow to use the military instrument to greatest effect; and learning from their own and others mistakes. (Author)

AD-A089 401/4 PC **A03**/MF **A01**
Army War Coll Strategic Studies Inst Carlisle Barracks PA
Soviet Policy in the Horn of Africa: The Decision to Intervene.
Strategic issues research memo.,
Richard B. Remnek. 10 Jun 80, 33p

The main intent of this memorandum is to elucidate the factors that appear to have influenced Soviet decisions to support Ethiopia during three stages of escalating involvement: prior to the Somali invasion in July 1977; in the aftermath of the invasion; and following the Somali expulsion of the Soviets in November 1977. The author also analyzes the priorities and preferences that were reflected in the policy choices made in Moscow during these periods. (Author)

AD-A089 601/9 PC **A04**/MF **A01**
Air Force Academy CO Library
The American Military and the Far East,
Mary Ann Robinson. Oct 80, 70p Rept no.
SPECIAL BIB SER-62

This highly selective bibliography was prepared for use at the Ninth Military History Symposium on 'The American Military and the Far East' held at the United States Air Force Academy, 1-3 October 1980. The resources cited were selected to try and show basic American interests including military operations, policy and strategy in the Far East, how the military saw its role and what part is played from the time of the Spanish-American War to the present. This bibliography was compiled by Mary Ann Robinson of the Reference Branch, United States Air Force Academy Library. The manuscript was prepared for the printer by Vonceil Porter.

INIS-mf-5609 PC **A04**/MF **A01**
Societe Francaise de Radioprotection, Paris.
Nuclear Energy and Liability in Law. Records of the Meeting.
1977, 59p
In French.
U.S. Sales Only.

The question of nuclear energy and liability in law was discussed at a one-day meeting organised jointly by the Societe francaise de radioprotection and the Societe francaise d'energie nucleaire. This report contains three of the papers presented. The first paper describes the different types of liability: civil, penal, administrative, international and explains the reasons which have led the legislator to introduce special liability rules to meet the problems raised by nuclear energy. The second paper deals with radiation protection and the different types of liability in law which may result from activities involving radiation protection. Finally, the third paper discusses nuclear risk insurance from the viewpoint of atomic insurance pools and specifies that insurers are concerned with improving accident prevention measures, in close collaboration with nuclear operators and the public authorities. (Atomindex citation 11:518588)

PB81-109506 PC **A02**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Economic Development Div.
Title XIV of the Food and Agriculture Act of 1977 (P.L. 95-113): A Summary by Section, Subtitle, and Part,
Alan R. Bird. Aug 80, 18p AGESCS-800822

Title XIV, known as the 'National Agricultural Research, Extension, and Teaching Policy Act of 1977' was signed September 29, 1977. Most provisions apply for five years. This summary was made to assist those concerned with extension and modification of the Act. This comprehensive Act establishes the Department of Agriculture as the lead agency for food and agricultural sciences; provides for program expansions, including food and nutrition, animal health and disease, small farms, 1890 Colleges, and solar energy; and the coordination of research, extension and teaching.

PB81-111270 PC **A05**/MF **A01**
Vermont Univ., Burlington.
Some Implications of Water Law and Rights Towards Land Use Planning: Vermont Case Studies.
Master's thesis,
Paul James Folkman. Mar 80, 97p W81-00010, OWRT-A-035-VT(1)
Contract DI-14-34-001-9048

A theory that water law and rights have an effect on land use planning and therefore should be included as a component in the land use planning process is proposed. Research presented summarizes Vermont's common, statutory, and administrative water laws and rights. Three Vermont case studies are examined which substantiate the proposed theory. The case study examples include a diversity of water resources and laws such as: running waters (rivers) and administrative law; standing surface water (lake) and administrative and statutory law; and ground water and the common law. The case studies identify some implications these various water laws have on the land use planning process.

5E. Human Factors Engineering

AD-A089 587/0 PC **A03**/MF **A01**
Virginia Polytechnic Inst and State Univ Blacksburg Human Factors Lab
Digital Image Processing Systems and an Approach to the Display of Colors of Specified Chrominance.
Technical rept.,
Willard W. Farley, and James C. Gutmann. 1 Aug 80, 40p Rept no. VPI-HFL-80-2/ONR-80-2
Contract N00014-78-C-0238

The recent proliferation of color displays has accentuated the need for a metric of color contrast which can be used to predict human operator performance. To obtain the data for forming a metric of color contrast, one needs the capability of presenting a broad range of colors in varying geometric arrangements. This report describes an approach to developing the capability to display colors of known chromaticity using a color digital image processing system. This report covers the development of measurement technique and software used in characterizing the display system, the reduction of spectroradiometric data, the use of color mixing equations for color digital image processing systems, and the development of display system software. (Author)

5F. Humanities

AD-A089 213/3 PC **A06**/MF **A01**
Texas A and M Univ College Station Dept of Anthropology
Archeological Test Excavations at Site 41WM21 in Granger Reservoir, Williamson County, Texas. Revised.
Final rept. Oct-Dec 76,
Gary L. Moore, Harry J. Shafer, Edward P. Baxter, John Ippolito, and Clell L. Bond. May 78, 110p Rept no. 37
Contract DACW63-76-C-0176

This report documents the attempts to salvage archeologically significant data by test excavations in areas of the site selected on the basis of least disturbance by construction activities. Three cultural occupational periods, correlated with separate geomorphic features, were identified during the course of test excavations. The artifactural assemblages indicate an intermittent occupation of the site during the Early, Middle, and Late Archaic Periods. (Author)

AD-A089 519/3 PC **A04**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH
Survey Analysis of Military Parishes: The Wright-Patterson AFB Catholic Parish Example.
Technical rept.,
Edward J. Dunne, Jr. Aug 80, 59p Rept no. AFIT-TR-80-5

Military parishes or congregations have unique problems because of their transient nature. Chaplains and lay leaders in military parishes need to use information about the opinions, attitudes, and felt needs of parishioners in allocating resources to programs and in the detailed planning of ongoing religious, educational, and social activities. One way to obtain such needed information is through a periodic survey of the congregation. This report outlines an approach to developing, administering, and analyzing a parish survey. A checklist for survey development is included. The bulk of the report is an extended example of a parish survey effort: the survey instrument, an example report of results, and recommended modifications to any follow-on survey. (Author)

PB81-103012 PC **A05**/MF **A01**
Archaeological Systems Management, Inc., San Diego, CA.
A Cultural Resource Survey and Evaluation of the Inaja and Cosmit Indian Reservation, San Diego County, California.
Final rept.,
Christopher W. White. Jun 80, 85p NPS/WAC-80/10

The report documents an intensive cultural resource survey of the Inaja and Cosmit Indian Reservation conducted by Archaeological Systems Management for the Western Archeological Center, National Park Service. The reservation consists of noncontiguous 800 acre and 80 acre parcels located within the Cleveland National Forest in north-central San Diego County. A total of nine sites and seven isolated artifacts or features were identified and recorded as a result of the survey. Most of the sites features were identified and recorded as a result of the survey. Most of the sites date from the Late Prehistoric occupation of the region, although historic sites and site components are also present. The resources were evaluated for possible inclusion in the National Register and potential impacts assessed. It is recommended that one of the sites, SDi-7847, be nominated to the National Register of Historic Places, whereas four other sites will require additional investigation before determinations of eligibility can be made.

PB81-103939 PC **A07**/MF **A01**
Nevada Univ. System, Reno. Desert Research Inst.
A Study of Cultural Resources Inundated by Island Park Reservoir, Fremont County, Idaho.
Lonnie C. Pippin, and Jonathan O. Davis. 1980, 149p
Contract DI-10-S0168

The rehabilitation of Island Park Dam, Minidoka Project, provided an excellent opportunity for the Water and Power Resources Service to inventory and evaluate the cultural resources inundated by the 3165 hectare reservoir over forty years ago. An inventory, evaluation, and study of the area was conducted to assess the impact of flooding and provide recommendations concerning the future management of the area. The study area, located across the lower Lodgepole Pine Forest-Sagebrush Steppe ecotone of south-central Idaho, incorporated approximately 2510 hectares of land within and slightly above the active zone of reservoir fluctuation. The field reconnaissance revealed the remains of 43 prehistoric and 26 historic archaeological sites situated on three terrace complexes (Bull Lake, Pinedale and Holocene) of Henrys Fork and its tributaries. Six prehistoric archaeological sites were tested for their potential to yield stratified cultural remains.

5H. Man-Machine Relations

PB81-110215 PC **A04**/MF **A01**
Universal Textile Machine Corp., Lawrence, MA.
Development of a Micro-Solenoid Operated Braille Display Cell,
Ernesto E. Blanco. Jun 80, 56p NSF/RA-800177
Grant NSF-PFR79-17730

This study investigated the critical parameters involved in the concept of a braille display letter unit capable of fitting into standard letter and line spacings and controlled electrically from a magnetic tape casette. A prototype model based on the research findings was built and tested successfully. This prototype comprises 140 components enclosed in a metallic shell the size of the little finger. It is capable of very fast cycling rates and provides a 'feel' almost identical to that of 'hard-copy' embossed braille. Vertically moving braille stimulators are driven by six micro-solenoids embodying a combination of leakage-flux and tapered-plunger principles, and providing ideal force-stroke characteristics with minimal power consumption. Once energized, the stimulators remain in the display mode without drawing power, held by tiny latches that 'jam' the solenoid stems and resist finger forces until released. This unit makes it possible to display refreshable braille in multiple lines at standard spacing in scientific instruments, computer readouts, word processing output systems, and the TSPS blind telephone operator's system. Illustrations, graphs, and diagrams amplify the text.

5I. Personnel Selection, Training, and Evaluation

AD-A089 160/6 PC **A03**/MF **A01**
Navy Personnel Research and Development Center San Diego CA
Accession Gaming Model (AGAM).
Final rept. for FY 79,
Alan Whisman, Yu-Song Yen, and Mark Chipman. Aug 80, 30p Rept no. NPRDC-TR-80-32
See also AD-A080 653.

This report is the second in a series describing manpower flow models for use in determining accession plans that provide sufficient input to the force, while preventing large surpluses and shortages in various force categories. The model described here expands a previous quarterly optimization model, the Recruit Input Optimization (RIO) Model, to allow specification of force goals in terms of structured strength and trained strength in addition to total strength. The optimization procedure minimizes a weighted sum of the surpluses and shortages from force goals, subject to constraint equations that control the flow of personnel through the force. A future report will describe the development of an annual Optimal Accession Requirements (OAR) Model, whose smaller size allows it to be linked with other personnel planning models. (Author)

AD-A089 175/4 PC **A08**/MF **A01**
Paradigm Consultants Tinton Falls NJ
Navy Attrition and Turnover in Private Industry: Concepts, Measurement and Management.
Final technical rept.,
J. A. Sheridan, and J. O. Monaghan. Aug 80, 160p
Contract N00014-80-C-0328

The Navy has had a significant problem in retaining personnel. Consequently, force loss (attrition) has been under study to determine the causes of and the appropriate steps needed to reduce force loss to a manageable rate. The current study addresses the methods used to control force loss in the private sector. Many private sector firms have been successful in maintaining a relatively low rate of force turnover. Current data from individual private sector companies and a review of the recent literature regarding force turnover provide the basis for the report. A comparison of methods used for the control of attrition between the Navy and the private sector is provided. (Author)

AD-A089 214/1 PC **A06**/MF **A01**
Naval Postgraduate School Monterey CA
Utilization of Women in the Navy: A Study of Historic and Current Employment Practices.
Master's thesis,
Joseph Michael Greene, Jr. Jun 80, 120p

With the advent of the All-Volunteer Force, utilization of women in the Navy has significantly increased. Women may well become even more valuable manpower assets given projected shortages in recruitable males, more equitable management policies, and changing social attitudes. A review of past Navy employment practices for females, discussion of current utilization, and considerations are made. Female petty officers retention problems and the reluctance of females to enter the more traditional male Navy ratings are causes for concern. The 'combat' assignment issue is analyzed. This writer concludes that more selective female recruiting practices, a long term evaluation of the Women in Ships program, and a study of low female enlisted retention rates are needed. Studies of womens' capability to satisfactorily integrate into combat environments are also essential. Only after these steps are accomplished can Navy planners accurately assess the effectiveness of females and possible limits on their utilization in the Navy. (Author)

AD-A089 248/9 PC **A03**/MF **A01**
Continental Army Command Fort Monroe VA
CONARC Training Workshop, Fort Gordon, Georgia, 5-7 October 1971. Volume I. General: Opening, Closing, and Dinner Sessions.
Final rept.,
Ralph E. Haines, Jr., Ira A. Hunt, Jr., George E. Fort, Harley L. Moore, Jr., and P. J. McDonnell. Oct 71, 45p
See also Volume 2, AD-A089 249.

The CONARC Training Workshop was conducted at the Southeastern Signal School, Ft Gordon, Georgia, 5-7 October 1971 (Appendix A and B). The purpose of the workshop was to foster an extensive interchange of ideas concerning advances and innovations in training practices and technology relevant to CONARC's training activities in keeping with the requirements established by the Haines Board and CONARC DOI/EA Conference. The US Army, US Navy, US Marines, US Coast Guard, US Air Force, other governmental agencies, along with members of civilian academic communities, were represented at the workshop. There were 265 registered participants, 80 speakers and 35 USASESS workshop staff. Analysis of the comments and suggestions provided by those attending the workshop indicated that the purpose of the workshop was achieved with a strong endorsement to have similar workshops in the future. Fort Gordon and the Southeastern Signal School were highly commended for the support they provided the conference. This final report along with related papers that may be developed, will serve as a basis for workshops to be conducted in the future. (Author)

AD-A089 249/7 PC **A06**/MF **A01**
Continental Army Command Fort Monroe VA
CONARC Training Workshop, Fort Gordon, Georgia, 5-7 October 1971. Volume II. Computers in Training Specialty Workshop.
Final rept.,
Ralph E. Haines, Jr., Ira A. Hunt, Jr., Vincent P. Cieri, Harold E. Mitzel, and Robert Gerry. Oct 71, 125p
See also Volume 3, AD-A089 250.

The twelve presentations have made it quite clear to the participants that computers are being extensively used in military training and civilian applications. These applications are diverse and tend to be restricted to a relatively small number of trainees at various locations. On the other hand, the number of students being served is increasing and the quality of programs is being improved rapidly. This conclusion seems to be true, not only of Army efforts but those of the Air Force, Navy and Marine Corps. Early and incomplete evaluations which compare students taught with CAI treatments and conventional instruction characteristically show small but significant superiority in achievement for CAI-taught groups. On a criterion of time saved, results of studies seem to favor CAI groups with time savings of approximately one-third when compared with conventional instruction. In addition to these favorable results, there are indications of real potential in terms of cost-effectiveness. However, much work remains to be done to adequately account for all factors which should be considered in cost-effectiveness assessment of CAI. In connection with evaluation efforts there is a definite need for carefully documented evaluation reports on CAI training experience. These reports are necessary to be able to demonstrate to higher echelons that there are quantitative data which support the qualitative decisions about the worth of CAI in meeting training needs.

AD-A089 250/5 PC **A05**/MF **A01**
Continental Army Command Fort Monroe VA
CONARC Training Workshop, Fort Gordon, Georgia, 5-7 October 1971. Volume III. Educational Television and Training Films Specialty Workshop.
Final rept.,
Ralph E. Haines, Jr., Ira A. Hunt, Jr., Jack Carrigy, E. J. Weaver, and Al Hemphill. Oct 71, 81p
See also Volume 4, AD-A089 251.

The ETV and Training Film Specialty Workshop was based on pre-prepared video tapes covering each presentation. The text of the live presentations therefore are in many cases related to the television developed presentation and full understanding is dependent upon viewing the tape. The ETV and Training Film Specialty Workshop was completely recorded and dubs may be made available as outlined at inclosure. This orientation on the CONARC ETV/Training Film Specialty Workshop to give you a summary of here and now with a preview of coming attractions. To peak your curiosity and get you to participate with us, we've chosen some workshop program highlights. Let's start with Help from the 23-Inch Giant which provides examples of how television can be effectively used to solve specific training problems and assist in completing the training mission. Video tape cassette/cartridge recorders are revolutionary communication tools which will bring new concepts and dimensions to training. Demonstrations of some of the new equipment will provide a look at the features and uses of video cassette/cartridge recorders for use in training. Cost Effectivess Through the Use of Television provides some examples of how CONARC schools and training centers are using television to save resources, and illustrates additional areas that can be recorded by television to conserve the use of limited resources.

AD-A089 251/3 PC **A08**/MF **A01**
Continental Army Command Fort Monroe VA
CONARC Training Workshop, Fort Gordon, Georgia, 5-7 October 1971. Volume IV. Individualized Instruction Specialty Workshop.
Final rept.,

Ralph E. Haines, Jr., Ira A. Hunt, Jr., Robert G. Smith, Jr., Kenneth Weingarten, and Donald F. Vaughn. Oct 71, 155p
See also Volume 5, AD-A089 252.

The recent renewal of interest in individualized instruction has led to the proponents of certain techniques claiming that they were individualized whereas other techniques were not. First, there is Rate Individualization. Here the student progresses at his own rate, moving as fast or as slow as he would like, or be motivated to go. An example is the linear program form of programmed instruction, or learning to play a musical instrument with a private teacher. The next form is Remedial Individualization. In this form, the student studies and then is tested. If he does not 'pass', he repeats or is given additional remedial material. This is illustrated by the scrambled book form of programmed instruction. It is also widely used in the service schools, where it is called recycling. In Proficiency Individualization, we provide the student with differing learning tasks depending on his level of proficiency at the start of instruction. If the student already possesses some knowledge or skills, and can demonstrate them, we do not require him to relearn them. Objective Individualization permits the student either to choose or to be assigned to different objectives. Elective systems are examples of this type of individualization. Finally, we have Method Individualization. Here, different students may learn by methods which are most appropriate. We can see that there are a variety of forms individualization can take. However, none are likely to be successful unless embodied in an instructional system. (Author)

AD-A089 252/1 PC **A08**/MF **A01**
Continental Army Command Fort Monroe VA
CONARC Training Workshop, Fort Gordon, Georgia, 5-7 October 1971. Volume V. Methods and Media Specialty Workshop.
Final rept.,
Ira A. Hunt, Jr., Richard S. Kneisel, Leslie J. Briggs, and Ronald W. Spangenberg. Oct 71, 153p
See also Volume 6, AD-A089 253.

The first workshop session for Methods and Media will start off with some theoretical considerations--our Resource Consultant, Dr. Leslie J. Briggs will set the framework of theoretical considerations. He will be followed by a type of panel presentation of HumRRO and service school representatives giving their experiences in selecting methods and media in the systems engineering of training--course design. The second session will be devoted to some theoretical and practical concerns in miniaturization, simulation, and simulators. Examples from the field will be given by HumRRO and the Infantry School. The third session will be devoted to the Army, Navy, and Air Force's experiences in learning centers and multimedia centers, with an opportunity to break into three groups for some close-in action. The fourth and final session will be on cost effectiveness and comparative effectiveness of media and methods. To help structure the discussion and your audience participation, we have made up some summary sheets with some questions to your cognitive processes and maybe even your affective processes. Please use these sheets as a guide (Inclosures 1-4). Also, there is an evaluation sheet (Inclosure 5) which we hope will provide positive feedback for both you and the managers and participants in the workshop. (Author)

AD-A089 253/9 PC **A05**/MF **A01**
Continental Army Command Fort Monroe VA
CONARC Training Workshop, Fort Gordon, Georgia 5-7 October 1971. Volume VI. Quality Control Specialty Workshop.
Final rept.,
Ralph E. Haines, Jr., Ira A. Hunt, Jr., William C. Osborn, Robert N. Johnson, and James L. Sherrill. Oct 71, 86p
See also Volume 7, AD-A089 254.

There was almost complete agreement that Army service schools should adopt criterion referenced evaluation as the means of insuring that the trainee can do each job for which he is trained. Also, in agreement that superior performance on one task could not compensate for inadequate performance on another and that in effect our courses should be 'multiple hurdle'. There was recognition that this goal presented problems in group paced courses, because time constraints cause problems in handling failures on an individual basis and because it is difficult to obtain recognition (on manpower surveys) of staffing to support remedial training. The workshop attendees believed the present requirement to identify the honor graduate, the honor students and the upper half of each class as eligible for promotion produces inequities. Whether real or imagined, this proved to be an issue of considerable concern. (Author)

AD-A089 254/7 PC **A05**/MF **A01**
Continental Army Command Fort Monroe VA
CONARC Training Workshop, Fort Gordon, Georgia 5-7 October 1971. Volume VII. Systems Engineering Specialty Workshop.
Final rept.,
Ralph E. Haines, Jr., Ira A. Hunt, Jr., Lucien R. Garneau, Robert S. Tamer, and Edwin J. Godfrey. Oct 71, 89p
See also Volume 1, AD-A089 248.

Each service element will present a brief but comprehensive status report concerning the utilization of systems engineering as a process for the design of curriculum. Presentation will identify problem areas and successes in the development and growth of the systems approach to course design. 'Overview of Course Design through the Systems Approach to Curriculum Development--a Survey of Contemporary Research.' (Author)

AD-A089 270/3 PC **A04**/MF **A01**
Continental Army Command Fort Monroe VA
Noncommissioned Officer Education and Professional Development Study.
1971, 62p

The following are among this study's recommendations: Retain the present Noncommissioned Officer Education System (NCOES) as the Army's program for noncommissioned officer education and professional development and implement it fully as rapidly as possible; Examine the NCOES and make modification to insure that every soldier in every military occupational specialty has a career path through NCOES to noncommissioned officer rank; Develop, insofar as possible, programs of instruction within NCOES which will include all MOS, consolidating instruction to insure flexibility in accommodating all MOS within programmed classes at each service school regardless of variations in ACMF and MOS training; Continue to analyze service school courses to eliminate duplication between NCOES and specialized and functional courses; Terminate the Skill Development Base Program as rapidly as possible, by 30 June 1972, or earlier, in favor of earlier expansion of NCOES; Retain the present organization of noncommissioned officer academies for the foreseeable future; and Develop on NCOES student procurement system to replace current solicitation procedures for procurement of best-qualified students, by establishment of mandatory quota requirements, which must be met, based on distribution of personnel within major organizations by MOS and rank.

AD-A089 273/7 PC **A03**/MF **A01**
Army Engineer Studies Center Washington DC
The Corps Work Force in Transition.
Final rept.,
Jonathan S. Thompson. Jul 80, 43p

This report presents the findings of a demographic analysis of the Corps of Engineers work force and evaluate the implications of these findings for the future. It includes an overall description of the work force by age, grade, and pay plan categories. It also addresses advancement opportunities as perceived by employees in selected occupational series and highlights management implications. (Author)

AD-A089 276/0 PC **A03**/MF **A01**
Army Military Personnel Center Alexandria VA
Vocational Interest and Army ROTC Success.
Final rept.,
Eric Charles Brown. 15 Aug 80, 41p
Master's thesis.

In this study, interest is used in an effort to predict whether students entering an Army ROTC program will successfully complete the program or drop out. The Strong-Campbell Interest Inventory was administered to 108 students in 5 classifications at Middle Tennessee State University during the spring of 1980. The classifications were First Year ROTC, First Year Non-ROTC, Upperclass ROTC, Upperclass ROTC Dropout, and Upperclass Non-ROTC. Four statistical analyses were made using a discriminant analysis program. The results indicate that statistically different interest scores were observed in the ROTC and Non-ROTC students and suggest that interest measures can be used to identify the students most likely to remain in the ROTC program. A regression equation was developed in an effort to predict these 'successes' on the basis of interest measurement. However, to determine the real success of this equation and the predictions resulting from its use, a longitudinal follow-up must be conducted of the present First Year ROTC class. (Author)

AD-A089 308/1 PC **A04**/MF **A01**
Army Engineer Studies Center Washington DC
Work Force Training and Development for the 1980s.
Final rept.,
John O. Moser. Jul 80, 54p

A detailed analysis of the current training and development program in the Corps of Engineers, US Army. Future needs are assessed and current shortcomings are identified. Recommendations are made to enhance Corps training of its employees to meet the challenges of the 1980's within the parameters established under the Civil Service Reform Act (CSRA). (Author)

AD-A089 310/7 PC **A09**/MF **A01**
Electronic Systems Div Hanscom AFB MA
Design of a Prototype Microcomputer Driven Training Device for an Air Force Maintenance School.
Final rept. Jan-Nov 78,
Michael F. Winthrop. Aug 79, 189p Rept no. ESD-TR-80-130
Master's thesis.

Microcomputers are no longer toys, they are cheap computers. This project proved that a commercial, 'off the shelf' microcomputer could run a simulator used in an Air Force Technical Training school. Research through the Defense Documentation Center (now the Defense Technical Information Center) showed nothing comparable in DoD. Commercial producers of trainers were also unable to show equivalent capability. A reproducible method to evaluate microcomputers is shown and used. Circuits are shown and discussed which provide control of the trainer and implement outputs. An invention is detailed which produces waveshapes for oscilloscope under program control. Software is provided, with full documentation, that generates waveshapes for the invention (above) which can then run independent of computer inputs. (Author)

AD-A089 311/5 PC **A05**/MF **A01**
Army Engineer Studies Center Washington DC
Developing and Managing the Corps Work Force for Future Missions.
Final rept.,
John J. Taylor, James R. Kirkpatrick, Jill M. Davis, John O. Moser, and Jonathan S. Thompson. Jul 80, 91p

This study analyzes the Corps of Engineers work force requirements for the 1980's and identifies specific actions which will enable the work force to meet these needs. It was undertaken to determine the investments in employee development and management that must be made today to assure that the Corps will have the personnel resources to meet the challenge in the next decade. (Author)

AD-A089 313/1 PC **A03**/MF **A01**
Army Engineer Studies Center Washington DC
Managing the Corps Work Force.
Final rept.,
Jill M. Davis. Jul 80, 34p

This report assesses the Corps of Engineers' human resources management posture today, acknowledges recent strides in this area, and pinpoints areas needing further development. It fo-

cuses on the Corps' problems with recruitment, training, career development, management information systems, and organizational climate. It makes recommendations for improving the Corps' processes and policies in these areas. One theme of the paper is to capitalize on strides made, especially employee selection and work description research conducted by contractors to suit Corps functions and work force. (Author)

AD-A089 325/5 PC **A03**/MF **A01**
Army War Coll Carlisle Barracks PA
Simulation in Training--The Current Imperative.
Military studies program paper,
Richard P. Diehl. 16 May 80, 32p

The central hypothesis of this paper is: the US Army can no longer afford to train its forces as it has in the past. Faced with severely escalating ammunition costs, while the ammunition budget is decreasing in real terms, plus extensive cost growth in components, spare parts, fuel and lubricants, as well as limited space in which to train, the Army must adapt a strategy of field training that relies on mechanisms other than actual expensive-to-operate combat equipment. The current training system is analyzed. Graphs and tables depict historical cost growth and experienced Army budgets. Simulation offers an alternative but the research, development and acquisition system cannot accommodate the expeditious development of critically needed simulation devices. There are major problems in the areas of timeliness of simulator developments, management diversity, funding dilemmas, and logistical support system inadequacies. Each problem is discussed and possible solutions are advanced. (Author)

AD-A089 334/7 PC **A04**/MF **A01**
Woodward-Clyde Consultants San Francisco CA
Manpower Planning and Personnel Management Models Based on Utility Theory,
Ralph L. Keeney. Aug 80, 59p
Contract N00014-79-C-0275

The personnel management and manpower planning problems of the United States Navy include complex value structures with no obvious external criterion for examining alternative courses of action. Recognizing this, the Department of the Navy has sponsored studies of the applicability of utility theory to the personnel management and manpower planning problems of the Navy. The purposes of this project are to review and appraise such efforts and to recommend further work using utility theory to assist the Navy on manpower problems. It is concluded that the previous applications had numerous unnecessary shortcomings. The specific problems addressed were not clearly defined, and appropriate procedures to assess utility were not used. However, recommended applications of utility theory to manpower problems have the potential for significant contributions. (Author)

AD-A089 370/1 PC **A09**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH
School of Systems and Logistics
A Dynamic Model of the Air Force Graduate Education System.
Master's thesis,
John R. Baker, and Stephen C. Forgie. Jun 80, 176p Rept no. AFIT-LSSR-57-80

The Air Force's Advanced Academic Degree Management System (AADMS) consists of a number of unrelated and dynamically changing parts which provide a challenge to AADMS managers' ability to create and operate an effective decision structure. A computerized model which caters for features both internal to, and external to, but impacting upon the system, has been designed to allow managerial experimentation with policy decisions. As well as potential policy decision implications, the model enables an analysis of system response to factors not directly under the control of the Air Force. (Author)

AD-A089 418/8 PC **A05**/MF **A01**
Army War Coll Carlisle Barracks PA
Objective Measurement of Training Readiness.
Study project rept.,
Ronald M. Robinson. 16 May 80, 90p
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The Army's training environment is hostile, and individual and collective training levels are not what they could and should be. Rather than debate the issue, the Army needs to develop and implement an objective training readiness measure (OTRM). It it doesn't, it may be forced to adopt one that does not properly meet its needs. An OTRM must be simple, not an excessive burden on trainer's time and address the impact of skill retention decay and personnel turbulence. To meet the data needs and apprehensions of commanders and key decision makers at all levels of the Army, an OTRM must reflect training status and not replace current evaluation procedures with a proficiency test approach. Job Books (JBs), Soldier's Manuals (SMs), and Army Training and Evaluation Programs (ARTEPs) offer a basis for establishing individual and collective training requirements, the last date of demonstrated GO/SAT performance, and the resulting 'gap'. With some modification and expansion, Job Books can be developed into total individual and collective training records. Recent computer hard and software developments offer a means of processing Job Book recorded data into a usable AR 220-1 training readiness reportable format. All this provides a 'Model-T' OTRM system. Initially, the OTRM proposed here would supplement the commander's current AR 220-1 subjective training status evaluation. Eventually it would replace it, and become a true objective measure of training readiness. (Author)

AD-A089 434/5 PC **A04**/MF **A01**
Air Force Human Resources Lab Brooks AFB TX
Flight Simulator Runway Visual Textural Cues for Landing.
Interim rept. Nov 76-Aug 79,
George H. Buckland, Eric G. Monroe, and Kent I. Mehrer. Aug 80, 51p Rept no. AFHRL-TR-79-81

The effects of seven different runway types were investigated on pilot performance during landings in a T-37 flight simulator. Data were also gathered on 6 of the same 12 pilots during actual T-37 aircraft landings at the Air Force Flight Test Center, at Edward AFB. The seven simulated runways consisted of one night runway and six day runways with varying amounts of textural information cues on the runway touchdown zone area. The night runway was also tested with and without touchdown zone landing lights (TD-Zone lights), and the day runways were tested with and without the runway overruns. The simulated aircraft average vertical velocity at touchdown decreased systematically from 201 ft/min for the night runway without the TD-Zone lights to 136 ft/min for the day runway with 4-foot texture patterns. The day runways alone, without the overrun, varied from 195 ft/min for the Bare Bones runway to 136 ft/min for the 4-foot texture pattern. Although these average vertical velocities were still much higher than those recorded in the actual aircraft (32 ft/min), the texture patterns did influence the pilot flare and touchdown in a systematic manner. Additional visual cues might have reduced the vertical velocities even more, but the limited edge capacity of the Computer Image Generation (CIG) scene did not permit the study of other visual cues while investigating texture patterns. The presence of the TD-Zone lights in the night scene also reduced the average vertical velocity at touchdown (190 ft/min), but this difference was not statistically significant.

AD-A089 612/6 PC **A03**/MF **A01**
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
Analysis of Manual Threat Evaluation and Weapons Assignment (TEWA) in the AN/TSQ-73 Air Defense System.
Technical rept.,
Charles C. Jorgensen, and Michael H. Strub. Oct 79, 34p Rept no. ARI-TR-419

As tactical air threats have increased, so has the need to efficiently coordinate ground defense. With the advent of computer aided command and control systems, the identification of human strengths and limitations has become critical to the success of the Army air defense mission. The research reported in this paper was conducted in 1975 during the early development of the AN/TSQ-73 missile minder. The missile minder is representative of a class of emerging air defense systems which place unusual demands on the processing capabilities of the human operator. The purpose of the research was to evaluate human operator performance under realistic task loading, aircraft threats, and manning configurations. As a result of this study, procedures were developed which can effectively be applied to assess operator performance under a wide variety of emerging air defense systems. The procedure can also be utilized to aid in firing doctrine development, assist human factors specification, and improve interoperability decisions in linked air defense systems. (Author)

ED-179 230 Not available NTIS
Syracuse Univ., NY.
A Model for Cost Effectiveness Analysis of CBE Assessment Strategies,
J. E. McNamara, and T. S. Joshnston. Aug 79, 89p
Sponsored in part by Office of Education, Washington, DC.
Available from ERIC Document Reproduction Service (Compuser Microfilm International Corporation), Arlington, VA. 22210.

The Cost-Effectiveness Analysis Model for Competency Based Education (CBE) Assessment Programs is designed to assist state and institutional decision-makers in the cost analysis of alternative assessment strategies in CBE programs. The general model indicates stages of decision-making related to the use of various assessment strategies within the CBE context. Data are initially collected and recorded in two separate data matrices--one for cost and one for effectiveness. The outcomes of each of these analyses are grouped in a data display for decision-making. Included in the described model are procedures for cost analysis, primary cost analysis, secondary cost analysis, primary effectiveness analysis, and secondary effectiveness analysis; a cost data matrix; an effectiveness data matrix; and a summative data display for decision-making.

ED-179 250 Not available NTIS
ERIC Clearinghouse on Information Resources, Syracuse, NY.
Assessing the Competencies of Media Professionals: A Model for Determining Costs and Effectiveness,
Evelyn H. Daniel, and Donald P. Ely. 1979, 68p
Contract NIE-400-77-0015
For a related document, see ED-149 740.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from Syracuse University Printing Services, 125 College Place, Syracuse, NY. 13210 (IR-39; $4.75 prepaid).

This is a summary of the procedures and outcomes of a study undertaken to develop alternative strategies for evaluating the competencies of library media personnel in competency-based programs. The study was prompted by a realization that, although competency-based programs for school library media specialists are increasingly being adopted by state agencies as a basis for certification and by educational institutions as a procedure for educating media professionals, the effort in developing these programs has been heavily weighted toward the generation of competency statements with little attention being paid to the perhaps more difficult problem of competency assessment. The methodology for this project involved working back and forth between literature review and theoretical model development, and the collection of empirical data testing various aspects of the model with formal and informal interviews of various experts to critique the developing model. A cost-effectiveness approach was selected as the most appropriate method, with the ultimate goal of providing educational decision-makers with an array of assessment strategies for each individual competency, together with the costs and effectiveness measures associated with each strategy.

ED-180 473 Not available NTIS
Bibliographic Retrieval Services, Inc., Scotia, NY.
The National Education Practice File Development Project: A Summary of Phase I Activities and Plans for Phase II,
Gregory Benson, Jr. Aug 78, 21p

Sponsored in part by National Inst. of Education, Washington, DC.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

The stated goal of the project is 'to accomplish the design and pilot test of a file of educational practices compatible with and complementary to ERIC'. This summary of the phase I (design) documentation outlines product requirements, and describes activities and outcomes to complete those requirements. Eight products are discussed in the report: (1) file idea list, (2) review of related information products and services, (3) screened file idea list, (4) preliminary design feature alternatives, (5) feasibility discussion of alternatives, (6) file design, (7) evaluation/test design, and (8) a revised phase II plan. An executive summary of these phase II plans includes discussion of the creation, pilot testing, and evaluation of a test practice file. Lists of the internal advisory committee and project advisory group committee complete this summary of the report.

ED-180 484 Not available NTIS
Attitudes Toward Instructional Media: A Comparison of Teacher Education and Computer Science Majors,
Howard T. Everson. Oct 79, 17p
Paper presented at the Annual Meeting of the Northeastern Educational Research Association, Fallsview, NY, October 1979.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The relationship between a fear of automation and teachers' attitudes toward a variety of instructional media is explored by comparing the attitude scores of teacher-education and computer science majors. Eighteen terms describing the instructional media were presented to both groups. Nine of the instructional devices were considered traditional, while the remaining nine were associated with automated instructional technology. The subjects, 78 undergraduate students, rated each term using six bipolar scales from the semantic differential. A repeated measures ANOVA lends further support to the hypothesis that a fear of automation is an important variable modifying teachers' attitudes toward instructional media.

ED-180 486 Not available NTIS
The Library-College in Higher Education. A Survey of Five of Its Structural Components,
Benjamin R. Williams. 1979, 23p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The library-college concept, which has been partially or totally adopted by numerous academic institutions in the United States, is an experimental, institutionalized program in which independent study replaces classroom lectures, with the library functioning as the physical and metaphysical heart of the campus. Reviewed in this paper are articles and existing research directly concerned with the relationship of five specific structural components of the contemporary library-college: (1) the learning mode, (2) the library, (3) the faculty, (4) the curriculum, and (5) the organization. A bibliography is provided.

ED-180 487 Not available NTIS
American Association of Univ. Professors, Washington, DC.
Library Faculty Salary Survey: Preliminary and Final Reports,
James T. Deffenbaugh. 1978, 21p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The first of these two reports by the Library Faculty Affairs Committee compares the findings of a survey of library faculty salaries at the University of Notre Dame with statistics reported by the Association of Research Libraries (APL)--based on 94 libraries--and the American Association of University Professors (AAUP) for 1557 libraries, as well as with average salaries by rank for teaching faculty at Notre Dame. The second report summarizes the findings of this survey and reports the main conclusion reached by the committee--that the N.D. library faculty should take no action as a group for salary enhancement of professional library positions. The reasons for this recommendation are discussed in some detail, and other related issues are noted. Appendices include tables showing average salaries by region for APL libraries and weighted average salary by rank and AAUP classificaton for 1977-78.

HRP-0901934/0 PC **A05**/MF **A01**
American Academy of Physicians' Assistants, Arlington, VA.
The Development of Standards to Ensure the Competency of Physician Assistants. Volume IV: Assessment of the Applicability of the Individual Physician Profile Program for Physician Assistants.
Final rept. 1 Jul 76-14 Aug 79.
1979, 93p
Contract PHS-HRA-231-76-0053
See also Volume 5, HRP-0901933.

The project observed the effects of a self-assessment program on the likelihood of physicians' assistants' (PA's) enrolling in courses for continuing medical education. To do that, 100 PA's attended the University of Wisconsin--Extension's individual physician profile (IPP) program; 89 completed the program. To help assess the program's applicability for PA's, attitudinal data were collected from PA's who had been contacted about and who participated in IPP. Data were collected regarding the participants' reactions to the program, and the reasons that some began but did not complete the program, declined to participate, or did not respond to the invitation to take part in the program. Data were also collected on the continuing medical education courses taken by the participants before and after completing the program. Attendance at the program had no discernible effect on the PA's taking additional continuing medical education courses. The evaluation committee concluded that IPP is not applicable for PA's.

HRP-0902378/9 PC **A04**/MF **A01**
Association of American Medical Colleges, Washington, DC. Div. of Educational Measurement and Research.
Characteristics of Medical Students in the National Health Service Corps (NHSC) Scholarship Program, 1973-1979.
Final rept. 19 Sep 79-9 Jul 80.
1980, 65p
Contract PHS-HRA-232-79-0085

The study examines the deomographic and socioeconomic characteristics and career plans of medical students in the NHSC scholarship program from 1973-74 through NHSC participants and the U.S. medical student population. Since some data were gathered from the students, a year prior to entry into medical school, those characteristics subject to change over time must be interpreted with caution. This applies to both populations in the study.

N80-32270/4 PC **A14**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Payload Crew Training Scheduler (PACTS) User's Manual.
D. L. Shipman. Jul 80, 308p NASA-TM-78284

The operation of the payload specialist training scheduler (PACTS) is discussed in this user's manual which is used to schedule payload specialists for mission training on the Spacelab experiments. The PACTS program is a fully automated interactive, computerized scheduling program equipped with tutorial displays. The tutorial displays are sufficiently detailed for use by a program analyst having no computer experience. The PACTS program is designed to operate on the UNIVAC 1108 computer system, and has the capability to load output into a PDP 11/45 Interactive Graphics Display System for printing schedules. The program has the capacity to handle up to three overlapping Spacelab missions.

PAT-APPL-6-167 276 PC **A03**/MF **A01**
Department of the Navy Washington DC
Computer Generated Image Simulator.
Patent Application,
Herbert Berke, John H. Allen, and Joseph R. Owen. Filed 10 Jul 80, 27p AD-D007 450/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The subject invention overcomes some of the difficulties inherent within the field of computer generated image simulation, including those mentioned above, in that it comprises a relatively simple computer generated image simulator. In particular, the subject invention was designed for the testing of the computer image generator display described in the aforementioned U.S. Patent Application Serial No. 104,521. Included in the subject invention are a head tracker for monitoring the horizontal, vertical, and rotational movement of the head of a trainee pilot, and an eye tracker for monitoring the horizontal and vertical movement of the eyes of the trainee pilot. Servomechanism means, which has attached thereto a visual target, rotates the visual target in accordance with the rotational movement of the head of the trainee pilot. A first television camera continuously scans the aforementioned visual target so as to allow for the broadcasting of the visual target upon the television screen of a display apparatus.

PB81-102741 PC **A07**/MF **A01**
Veterans Administration Medical Center, Little Rock, AR.
Guidelines for Writing Proficiencies: A Correlation of Proficiency Rating Pattern Elements with Functional Statements,
Yvonne Robinson. Jan 80, 150p

The Proficiency Rating System set forth in the Department of Medicine and Surgery Supplement MP-5, Part II, Chapter 6, Change 3 is utilized for the evaluation of nurses. Within this project, guidelines for writing proficiencies for junior through senior grades according to Rating Patterns 6, 7 and 9 have been developed. Also, Pattern Elements and Qualification Standards have been correlated into Functional Statements.

PB81-104002 PC **A03**/MF **A01**
Society for Advanced Medical Systems, Chevy Chase, MD.
Instructor's Manual for Allied Health Apprenticeship Training.
Jul 80, 41p
Grant DL-20-24-79-44

Under a research contract from the U.S. Department of Labor's Office of Research and Development, the Society for Advanced Medical Systems (SAMS) has developed an Instructor's Manual for Allied Health Apprenticeship Training. The instructor's manual is part of the first phase of a demonstration project of performance-based career development in Allied Health Care Apprenticeship training. Instructors in Allied Health Care Apprenticeship training will find the manual useful in identifying the best methods of instruction, in determining the objectives of the instruction in ways that leave no opportunity for misunderstanding, in evaluating the apprentices' progress, and in diagnosing any barriers to learning that may occur.

PB81-104010 PC **A04**/MF **A01**
Society for Advanced Medical Systems, Chevy Chase, MD.
Training Guide for Health Care Assistant Apprentices.
Jul 80, 73p
Grant DL-20-24-79-44

The Training Guide for Health Care Assistant Apprentices is designed to assist sponsors of Health Care Assistant apprenticeship training programs to develop training plans. The training guide has been organized in a manner in which it could be utilized by most institutions. The objective is to provide the basic tasks and procedures according to national standards that should be implemented in establishing those behavioral practices essential for good patient care. The guide will describe to the Health Care Assistants (HCA's) their role on the health care team; the functions of this institution and its relationship to the delivery of health care; the regulations of the institution, the rights of patients and the rights and responsibilities of the HCA and the legal and ethical implication for the health care institution and for licensed personnel.

PB81-104689 PC **A09**/MF **A01**
Tennessee Univ., Knoxville. Transportation Center.
Railroad Management and Engineering: Educational Needs and Recommended Programs.
Final rept.,
Edwin P. Patton, C. John Langley, Jr., Michael S. Bronzini, Robert W. Rochelle, and Joseph M. Googe. Mar 80, 198p TC-79-015, FRA-OPPD-80-3
Contract DOT-FR-9037

The modern educational needs of the rail industry can best be met by a combination of focused and practical seminars and short courses for present and prospective professional employees, support for enrichment of the railroad content of university transportation offerings, a university railroad research program, and fellowship support. This is the consensus of more than 90 senior-level individuals interviewed, representing all segments of the industry, including railroads, Government agencies, suppliers, consultants, associations, and universities. The railroads state that they are having little difficulty in attracting talented people, but new employees typically, have no specialized railroad knowledge, which adversely impacts job expectations, career motivation, and employee retention. Railroads actively recruit the small number of new graduates with rail training. Suppliers, Government agencies, and consultants have greater recruiting problems and correspondingly have greater needs for improved educational programs. The recommended university programs will have an immediate and positive impact on railroad recruiting and will help to strengthen innovation in the railroad industry.

PB81-106684 PC **A06**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA. Processing Research Inst.
Processing Research Institute, Fourth Annual Progress Report.
Jun 75, 101p PRI-75-141, NSF/RA/G-75/103
Grant NSF-GI-29728
See also report dated Jun 74, PB80-113434.

The report describes three years of active project work of the Processing Research Institute (PRI) at Carnegie-Mellon University in conducting a two-year professional Master of Engineering program. PRI involves faculty and students whose chief objective is interation with industry through a project-oriented graduate program. Engineering research in the broad multidisciplinary area of processing provides the vehicle for this interaction. PRI is designed to bring balance to the educational program by introducing a problem-oriented thrust. It also enables students to gain experience in real engineering problems and project management. During this three-year period, twelve students received the Master of Engineering degree. Thirty-four projects with an aggregate value of $1.3 million were sponsored by industry. The format of PRI has proven to be an effective way for an academic institution to interface with industry under a minimum of constraints. Students and faculty have demonstrated the ability to successfully complete engineering projects which are oriented towards results and conducted in an industrial time frame.

PB81-107054 PC **A04**/MF **A01**
National Conference of State Legislatures, Denver, CO.
Achieving Effective Staff Utilization: A Legislator's Guide to Personnel Management,
Lucinda S. Simon. Jul 79, 60p NSF/RA-790477
Grant NSF-ISP77-17355
Sponsored in part by Office of Personnel Management, Washington, DC.

An attempt is made to put forward a rationale for legislative personnel management. The need for human resource management is discussed, an overview of past and current practices is presented, and some basic objectives and principles are outlined. The special conditions of legislative employment are noted, particularly in light of their impact on personnel management. Some basic personnel functions and policies are reviewed and state examples are cited.

PB81-108706 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Evaluating a Structured Approach to Teaching Driving Skills by Identifying Underlying Principles.
Pat Wells, and A. J. Downing. c1980, 27p TRRL-SUPPLEMENTARY-577

Some driving skills may be better learned if the learner driver is provided with principles which relate to safe driving actions to be taken. To test this two programmed texts were produced which covered the principles of (1) signals and interpretation of signals and (2) the safe gap which should be maintained around a vehicle. In three separate experiments, groups of army cadets, RAF trainees and pupils at commercial driving schools used the programmed texts. Results showed that all the groups benefitted from the use of the texts, reducing the incidence of driving faults related to signalling and safety gaps and improving their theoretical knowledge in these areas. (Copyright (c) Crown Copyright 1980.)

PB81-110223 PC **A13**/MF **A01**
Manpower Demonstration Research Corp., New York.
The Youth Entitlement Demonstration: An Interim Report on Program Implementation.
Rept. for Jan-Sep 78,
Joseph Ball, William Diaz, Joan Leiman, Sheila Mandel, and Kenneth McNutt. Apr 78, 283p
DLMA-28-36-78-36-11
Grant DL-28-36-78-36

The research report covers the planning, start-up, and early site operations of the Youth Entitlement Demonstration from January to September 1978. The Youth Entitlement Demonstration is a guaranteed jobs program mandated by Congress. The Department of Labor engaged the Manpower Demonstration Research Corporation (MDRC) to manage the research and analysis of the demonstration and to coordinate its implementation under the direction of the Department of Labor's Office of Youth Programs. This report covers the planning, start-up, and early site operations of the demonstration. It seeks to document and analyze the institutional and programmatic role of the schools and the prime sponsors, to analyze the adaptability of CETA to the requirements of operating a job entitlement program, and to study the role of the schools as participating organizations. A preliminary measure of program costs is included.

SHR-0003578 PC **A08**/MF **A01**
Social Security Administration, Washington, DC. Office of Family Assistance.
Planning and Assessing Agency Training.
Monograph
Jean Fine. Jul 79, 161p DHEW/PUB/SSA-08008
Revision of a version dated March 1978. Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003578/ES.

Theoretical literature and research findings about relations between work performance and training are integrated into a conceptual framework for planning and evaluating different training programs and policies, along with agency management of training programs. By focusing attention on individual and agency performance factors and on training attributes pertinent to program outputs, relevant to managerial decisionmaking, and sensitive to changes in training, this guide should assist State and local agency managers in making training program decisions. Regarding staff accountability for implications of training programs, two major questions to be addressed are how well goals are achieved and what activities are directed at goal attainment. Training program decisions do not involve merely what type of training to select and whether to train; often, the issue is training versus some nontraining alternative to ensure that workers have necessary skills. Training needs are created when new knowledge is introduced, technology is changed, new procedures are introduced, and whenever important elements in an operating environment change, and an organization alters internal processing to adapt to external change. Needs and interests in training, generated by events outside the work situation, become a concern of organizations when they intrude on the work floor and affect worker production. Work organizations, which take cognizance of these events and passages and provide relevant learning and growth experiences, benefit by better work and higher productivity. Benefits also accrue to the extent that training programs facilitate a match between requirements of immediate work situations and skills available. Training is directed to the transfer of knowledge and personal, functional, and specific content skills. The assessment of training and relationships between training and organizations are discussed, with reference to the characteristics of a successful training program. References for further study are listed.

SHR-0003579 PC **A02**/MF **A01**
New York State Office of Mental Retardation and Developmental Disabilities, Thiells. Letchworth Village.
Training Staff of Developmental Centers.
Thomas J. Mulhern. 1978, 12p

Rapid changes are occurring in almost every aspect of facilities providing care to mentally retarded and developmentally disabled persons. Increasing attention has been focused on the need to create staff training and organizational development techniques. This article addresses the role which a training department can play in meeting these needs. The movement from a custodial care model to a model which emphasizes treating handicapped people in as nearly a normal fashion as possible in small, community - based facilities has required an extensive retraining of staff, especially aides who have the most intimate client involvement. Staff must begin to perceive of themselves as change agents and facilitators of growth among their clients, and help the retarded person move from total dependence to maximum independence. Therefore, staff training programs should develop and refine behavioral shaping skills. The movement towards this new care model brings with it increasingly complex management problems resulting from the competing and often conflicting demands of various regulatory bodies, budgetary committees, labor organizations, advocacy groups, and community organizations. Only by establishing clear treatment goals for each resident and clear administrative goals for each service unit can a reasonable response be made to these various groups. Management must be trained in establishing objectives, organizing resources, and motivating staff. No references are provided.

SHR-0003580 PC **A02**/MF **A01**
New York State Office of Mental Retardation and Developmental Disabilities, Thiells. Letchworth Village.
Staff Training Department in a Developmental Center.
Thomas J. Mulhern. 1978, 24p

The necessity for, and organizational features of, a staff training department in a developmental center are reviewed, with particular reference to residential facilities for the mentally retarded. The process for implementing training programs is also discussed, and a variety of evaluative components are described. The advantages of a centralized training department in a care facility for the mentally retarded are apparent when one considers the attrition rates at such institutions -- as high as 25 percent. Concentrating the training function in a single office would enable staff to keep better pace with the turnover, could assure accomplishment of a common orientation to treatment, and would justify the purchase of expensive audiovisual technology and associated learning aids. To determine which skills to include in a training program, staff should use questionnaire surveys, targeted interviews, and internal observations, as well as the perusal of incident reports, to ascertain the most frequent and significant tasks. The formally established objectives of a facility and periodic surveys and evaluations may also point out training needs. In addition, every staff training effort should have a specific set of empirical objectives, a specific methodology, and a lesson plan. Empirical indices corresponding directly to the training objectives are the most desirable ways to measure training effectiveness. For example, a training effort designed to reduce the frequency of medication error can be assessed by contrasting the frequency of such errors prior to training to those subsequent to training. Finally, two monthly ratios that are useful toward evaluating departmental efficiency are provided. Some references are included.

SHR-0100901 PC **A05**/MF **A01**
College for Human Services, New York.
Citizen as the Integrating Agent.
Audrey C. Cohen. Sep 78, 76p
Number 9 of Project SHARE's Human Services Monograph Series.

A new human services delivery profession grounded in a new mode of practice is needed to allow a collaborative relationship between the professional and the service receiver and, equally important, a transfer of capability from the professional to the individual in need of assistance. Furthermore, professional education must be rethought and redefined to initiate this kind of approach. The model presented here stems from and reflects economic developments, such as society's move from an industrial to a postindustrial society with over 66 percent of the work force engaged in service occupations. Consequently, it is based on a service ethic that recognizes that care about human beings is important and satisfying and rewards can come from doing a good job for others. It denotes empowerment, or the ability of people to manage their lives, recognize and meet their needs, and fulfill their potential as creative, responsible, productive members of society as the ultimate service goal. Implementstion involves establishing and achieving appropriate purposes, clarifying one's values and dealing with value issues, effectively understanding self and others, understanding and working effectively with systems, and developing and using needed skills. Eight major areas will be essential to this new type of human service work: (1) assumption of responsibility for lifelong learning, (2) the development of professional relationships with citizens and coworkers, (3) work with others in groups, (4) functioning as a teacher, (5) functioning as a counselor, (6) functioning as a community liaison, (7) functioning as a supervisor, and (8) acting as a change agent. A hypothetical example is presented of constructive action illustrating the kinds of knowledge attitudes and points of view involved in empowerment. The citizen role is discussed, and the altered human service delivery system, implications for education, and charting productivity in the human services are explained. A brief description of the constructive action process, the citizen empowerment guide, and pertinent forms are included, as are references and a bibliography.

5J. Psychology (Individual and Group Behavior)

AD-A089 192/9 PC **A04**/MF **A01**
Northwestern Univ Evanston IL Dept of Psychology
The Effect of the Difficulty of One Task on the Simultaneous Learning of Another Task.
Technical rept.,
Benton J. Underwood, and Arnold M. Lund. Aug 80, 64p
Contract N00014-78-C-0661

In simultaneous learning two verbal lists are interlaced for study, with each tested separately. In the present experiments simultaneous learning was used as a means of determining the conditions under which study time or learning resources might be reallocated between lists. One of the lists was called the standard list and it remained constant across the conditions of each experiment. The other list, the variable list, was manipulated to produce differences in its difficulty. If performance on the standard task varied as a function of the difficulty of the variable list, we inferred a shift in study time. In a more general sense, the purpose of the experiments was to determine the strategies that a subject might use to maximize the learning when the instructions are to learn as many items from both lists as possible. In addition, one of the studies suggested the possibility that when the processes underlying the two tasks are uncorrelated, performance on both tasks is enhanced. Another study indicated support for the theory which asserts that the spacing effect is due to an attenuation-of-attention for massed items. Our general conclusion is that subjects reallocate study time between two tasks being learned simultaneously only when there are obvious differences in difficulty.

AD-A089 223/2 PC **A03**/MF **A01**
New York State Coll of Agriculture and Life Sciences Ithaca Dept of Education
How Do Young Adults Read Directions with and without Pictures.
Technical rept. 1 Mar-31 Aug 80,
David E. Stone, and Marvin D. Glock. Sep 80, 39p Rept nos. RR-2-SER-B, TR-1
Contract N00014-80-C-0372

This research is designed to explore the manner in which people read and use procedural information (directions) presented to them in text and illustrations. University undergraduates read directions for the assembly of a model loading cart, assembling the model as they read. The use of illustrations with text was found to produce significantly more accurate performance of the task. Results also suggest that specific types of information are presented more effectively in texts or in illustrations. (Author)

AD-A089 619/1 PC **A03**/MF **A01**
Decision Research Eugene OR
How Well do Probability Experts Assess Probabilities.
Technical rept. Jan-Aug 80,
Sarah Lichtenstein, and Baruch Fischhoff. Aug 80, 31p Rept no. PTR-1092-80-8
Contract N00014-80-C-0150

Past research on people's ability to assess probabilities has shown two common errors, overconfidence in one's knowledge and insensitivity to task difficulty. This research has created a new class of experts: those who have studied probability assessors and who are aware of the common errors. The performance of eight such experts is here compared to the performance of twelve untrained subjects and fifteen who had previously received training in probability assessment. All subjects responded to 500 general-knowledge items whose difficulty could be measured a priori from the item context. The experts appeared to have overcorrected for the overconfidence error: they were notably underconfident, whereas the untrained subjects were overconfident and the trained subjects were mixed. The experts were more sensitive than the other two groups to variations in item difficulty. However, even they showed a substantial insensitivity to difficulty, relative to ideal performance. Introspection suggests that this second error would be hard to overcome. (Author)

N80-32097/1 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Flight Div.
Visual Scene Perception. Frequency Domain Data and Model Parameter Estimation Procedure.
P. H. Wewerinke. 15 Mar 79, 24p NLR-MP-79009-U
Sponsored by Netherlands Agency for Aerospace Programs (Nivr). Presented at 15TH Ann. Conf. On Manual Control, Dayton, Ohio, 20-22 Mar. 1979.

Results of a theoretical study and an accompanying experiment are presented concerning the visual scene perception process and its impact on aircraft approach performance. Visual scene characteristics were represented by the configurations involved. Their effect on approach performance and human information processing (primarily in terms of observation noise spectra and perceptual thresholds) was investigated utilizing a model of the visual scene perception process. The model is based on linear perspective geometrical cues and on relative (visual) motion cues and is combined with the optimal control model. Results are presented of an automated model matching procedure. Via a first order gradient method, a matching criterion (involving variances and frequency domain data) was minimized yielding a set of observation noise model parameter values. These values led to the perceptual thresholds associated with the visual cues involved.

PB81-104994 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Predicted Performance of Organised Car-Sharing Schemes.
P. W. Bonsall. c1980, 25p TRRL-SUPPLEMENTARY-565
Prepared in cooperation with Leeds Univ. (England). Inst. for Transport Studies. Also pub. as ISSN-0305-1315.

The report gives results of surveys of car pool plans.

5K. Sociology

AD-A089 274/5 PC **A03**/MF **A01**
Army War Coll Carlisle Barracks PA
Social Security--An Institution in Crisis.
Study project rept.,
Richard P. Diehl. 16 May 80, 35p

Social Security is one of the most intensively managed Federal programs in existence. Yet, financially it promises to have serious problems in the future. Though much is written about the system, few Americans understand it--further, they find it incredulous that the system could be facing bankruptcy. Eligibility rules were generalized from the Social Security Handbook. Examples of three workers--the first made the minimum wage all his working life, the second the average non-farm wage, and the third the wage that would contribute maximum social security amounts yearly--are used to show how social security benefits are currently figured. These examples form the basis for a comparison with alternative pension plans. The American system is compared to the French and German versions and finally commentary is advanced to consider options for the future. (Author)

AD-A089 393/3 PC **A02**/MF **A01**
Army War Coll Strategic Studies Inst Carlisle Barracks PA
Poverty - A Source of Conflict,
Joseph L. Sites. 25 Aug 80, 19p

No abstract available.

AD-A089 675/3 PC **A04**/MF **A01**
Environmental Research and Development Foundation Tucson AZ
Post Occupancy Evaluation of a Remote Australian Community: Shay Gap, Australia.
Special rept.,
Robert Bechtel, C. Burgess Ledbetter, and Nancy Cummings. Jul 80, 62p CRREL-SR-80-29
Contract DACA89-78-M-2086

A post occupancy evaluation (POE) was made of Shay Gap, an iron mining community in Western Australia. More than 50 design hypotheses were tested with results favoring the original design. Selecting a townsite surrounded by hills was deemed successful by residents. Keeping automobiles out of the living areas increased the safety of children and made residents walk and socialize more. A centrally located building housing the shopping facilities, beauty parlor, bank, post office, and snack bar served as the focal point of the community. Bland, off-white interiors allowed residents to express themselves when decorating. Shay Gap was a successful design concept for communities designed for remote areas in either hot or cold regions. (Author)

ED-180 483 Not available NTIS
Swedish Broadcasting Corp., Stockholm.
Children and Television in the Socialization Process. Some Results of Scandinavian Research. No. 28,
Cecilia Feilitzen. 2 Dec 75, 41p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This study briefly reviews the findings of Scandinavian research on children and television in the socialization process. Viewing habits of children, their social situations, and the breakdown of various viewer groups are explored. The interactive nature of television programs that seek active responses from children are discussed, as well as television's influences on the child's norms and values, mostly in regard to program preferences expressed by this group. Research relating to educational programming is further explored. An extensive reference list to Scandinavian resources on television

research, and a subject index to the report are included.

PB81-100687 PC **A16**/MF **A01**
Applied Resource Integration Ltd., Boston, MA.
Evaluation of the Easyride Specialized Transportation Service.
Final rept. Sep 76-May 79,
Peter Edelstein. Nov 79, 354p UMTA-06-0049-80-4
Contract DOT-TSC-1248

The evaluation of the EASYRIDE demonstration project was funded by the Urban Mass Transportation Administration, through the Transportation Systems Center. The project took place on the Lower East Side of Manhattan in New York City. EASYRIDE began operation as a pilot program in June 1976. After receiving its complete vehicle fleet, it began full scale operations in April 1977. During the first two years of the demonstration project, there was no required passenger fare; however, donations were accepted. This evaluation report covers the first two full years of operation, which was from June 1977 through May 1979. The Vera Institute of Justice was the grantee for this project in which door-thru-door demand-responsive transportation service was provided to elderly and handicapped residents of the Lower East Side. The door-thru door nature of the project refers to the fact that EASYRIDE drivers will leave the vehicle to assist passengers boarding and alighting from the vehicle. Service was provided by five fully accessible lift-equipped vans and five regular vans. Most of the drivers for the EASYRIDE project were graduates of the Wildcat Corporation program which trains rehabilitated ex-offenders and ex-addicts for work on public service projects.

PB81-102022 PC **A05**/MF **A01**
Allen and Hoshall, Inc., Memphis, TN.
40-Block Revitalization Strategy for the City of Dumas, Arkansas.
Jun 80, 90p EDA-80-0139
Grant EDA-08-29-02093

The objective of this strategy is to provide guidelines for a series of projects intended to correct the present economic deterioration within a 40-block area. Just as the problems of this target area are negatively affecting the entire population of Dumas, the entire population would benefit positively if strategies are devised to implement positive development. In general, the aim of the strategy is to improve the appearance of the target area to make it more attractive to new businesses and industries as a good environment for future location. All of these problems will have to be dealt with in some way to effect a total and successful revitalization of the physical city in an effort to become the base for the economic revitalization of Dumas.

PB81-103822 PC **A09**/MF **A01**
Soil Systems, Inc., Bloomington, IN.
Test Excavations at Waverly Ferry, Clay County, Mississippi.
Interim rept.,
William Hampton Adams, Dale L. Martin, Jack D. Elliott, Jr., and James E. Adams. Dec 79, 186p
Contract HCRS-C-5933(79)
Sponsored in part by Corps of Engineers, Mobile, AL. Mobile District.

This report details the methods and results of the survey and the test excavation of 11 sites at the Waverly Ferry Access Area, Clay County, Mississippi. Preliminary oral and archival research was undertaken simultaneously. These investigations revealed the presence of 45 sites in the area, but only 11 of these were contained in the recreation area. These sites date from the 19th and early 20th centuries and are associated with Waverly Plantation.

PB81-104697 PC **E05**/MF **E05**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
Migration and Settlement: 6. Canada.
Final rept.,
Marc G. Termote. c1980, 114p RR-80-29
See also report dated 1980, PB80-175649.Color illustrations reproduced in black and white.

The report analyzes regional demographic changes in Canada. The investigation on a provincial basis draws attention to some very important implications of recent demographic behavior in Canada and to emphasize the need for a more conscious population policy. Reports summarizing previous work on migration and settlement at IIASA are listed at the end of this report.

PB81-104713 PC **A09**/MF **A01**
Citizen for Better Driver Records, Inc., Washington, DC.
National Driver Register (NDR) Study of Selected States.
Final rept.,
Kenneth L. Nathanson, and Frances M. Nathanson. Jul 79, 183p DOT-HS-805-543
Contract DOT-HS-8-01985

The report studied State participation and the degree of effectiveness of the National Driver Register (NDR) program in four States; Iowa, Pennsylvania, Virginia, and Washington. The study States estimated their follow-up use of the NDR identification reports as 45 to 65 percent either by denial or withdrawal of license and/or for entering the data into the new State driver record when the license was issued. States discard the NDR reports on the basis of (1) time (too old, currently restored, or valid at the time of application); (2) reasons for withdrawal incompatible with State statutes; and/or (3) incorrect identity of driver. The report points up the deficiencies of the NDR/State program, focuses on the means to improve effectiveness of NDR reports and ways to encourage greater State participation and higher use of NDR product.

PB81-106379 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Domestic Housing and Community Development Issues for Planning.
Report to the Congress.
24 Sep 80, 85p CED-80-139

As we enter the 1980s a decent, safe, and sanitary home and a suitable living environment for all Americans is a goal that is still far from being achieved. The increasing cost of constructing and operating housing continues to adversely affect our Nation's efforts in meeting housing needs. Likewise, the migration of people and jobs and the increasing cost of providing essential community services have placed many communities in a serious financial position. Whether these problems can be successfully resolved are major questions to be answered in the years ahead. This study examines current and emerging issues relating to Federal involvement in the housing and community development area and represents the perspective used in organizing GAO audit efforts.

PB81-106908 PC **A05**/MF **A01**
Los Angeles County Bar Association, CA. Lawyers for Housing.
Fair Sharing: The State of the Art,
Don Bryant. 1980, 86p HUD-0001625
Contract HUD-H-5013RG
Prepared in cooperation with University of Southern California, Los Angeles. School of Urban and Regional Planning.

This report on the Fair Share Conference held at the University of Southern California in May 1978 presents the structure of the conference and the areas of discussion. Primarily, fair share is a result of local innovations that have been raised to national policy. It is defined as expanding opportunities for disadvantaged people, cities, and places through resource allocation. The concept of tax-base sharing and sharing industrial siting are presented with background information and with an evaluation of their current status. Agencies investigating these areas are the State Office of Planning and Research (OPR), the Assembly Office of Research (AOR), and the Association of Bay Area Governments (ABAG). The efforts of a task force on sharing industrial siting (location/allocation analysis as a joint program with ABAG and OPR) are narrated. Basic issues in industrial fair sharing are discussed, including air quality (economic constraints, trade-offs, the Standard Oil Company project (SOHIO), pocket siting, and 'bubbles' in which a single pollution limit is applied to the plant as a whole) and water quality (the Aliso Viejo project). It is concluded that although the state of the art of fair sharing is embryonic, there is a growing recognition of intraregional dependency and the need for an efficient and equitable distribution of burdens and benefits. A summary defines sharing, the effects of metropolitan and national markets, linkages between fair share policy areas, and political considerations. A list of exhibits is provided.

PB81-106924 PC **A07**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
Describing Target Neighborhoods: Neighborhood Housing Services, 1978,
William G. Moss. Apr 80, 145p HUD-0001655, HUD/PDR-538(2)
Contract HUD-H-2674

The study analyzes the activities of the Neighborhood Housing Services (NHS) and the individual NHS Organizations, and evaluates their impact on stabilizing and revitalizing the declining inner-city neighborhoods in which the NHS programs operate. The purpose of NHS is to improve housing and halt neighborhood decline by engaging the resources and self-interest of local residents, financial institutions, and city government. Using data collected for the impact evaluation and census data going back to 1950, the study analyzes neighborhood trends over the previous 28 years; compares current characteristics of NHS areas with characteristics used by the Neighborhood Reinvestment Corporation as criteria for selecting neighborhoods; and assesses resident perceptions and use of NHS services. The study documents a variety of problems in NHS neighborhoods including poor street conditions, litter, and run-down and abandoned houses. NHS residents are most dissatisfied with park neighborhood services, followed by police protection. Neighborhoods with older NHS programs are larger than those with new programs and contain a larger percentage of black residents. In all, about 3 out of 10 residents in the 20 abandoned neighborhoods have heard of the NHS programs. The preliminary analyses suggest that program utilization rates are higher for whites and Hispanics than for blacks, although this may be attributable to differences in homeownership rates among these groups. Finally, there is surprisingly little relationship between NHS usage and various neighborhood characteristics. Tabular data are given. Appendices provide tables and sampling procedures for the NHS Neighborhood Impact Analysis.

PB81-107013 PC **A16**/MF **A01**
RAND Corp., Santa Monica, CA.
The Design of the Housing Assistance Supply Experiment,
Ira S. Lowry. Jun 80, 365p R-2630-HUD, HUD-0001650
Contract HUD-H-1789

The report describes and explains the principal features of the Housing Assistance Supply Experiment (HASE) sponsored by the HUD Office of Policy Development and Research as part of a broader Experimental Housing Allowance Program (EHAP). This program is intended to help the agency decide whether a national program of housing allowances for low-income families would be preferable to existing programs of housing subsidies for the same general target population and if so, what form housing allowances should take. Section II lists four clusters of critical questions about the effects of such a program; describes the general strategy of the supply experiment in seeking empirical answers to these questions; and provides a chronological overview of the contemplated experiment from site selection through termination. The proposed design of the experimental allowance program is presented in Section III. Additional sections describe a proposed monitoring program, plans for assembling the data into machine-readable files, and plans for analyses related to one of the major research topics with which the supply experiment is charged. A final section evaluates the probably success of the supply experiment. Appendices include a mathematical model of housing deterioration and details of the experimental design and methodology. Footnotes and tabular data are provided.

PB81-108417 PC **A14**/MF **A01**
Manpower Demonstration Research Corp., New York.

The Youth Entitlement Demonstration. Interim Report on Program Implementation (2nd),
William A. Diaz, Joseph Ball, Nancy Jacobs, Loren Solnick, and Albert Widman. Mar 80, 302p
DLMA-28-36-78-36-14
Grant DL-28-26-78-36

The report reviews the progress made by the sites from September 1978 through August 1979 in implementing Entitlement's rigorous program model. The Youth Entitlement Demonstration, mandated by Congress in the Youth Act of 1977, establishes a job guarantee in 17 communities for disadvantaged 16 to 19 year olds, conditional on their returning to or remaining in school. Overall, this report documents the improvement of the sites in implementing Entitlement's program model. The report also documents the fact that large numbers of youths were successfully recruited and in almost all cases, that a sufficient number of jobs were provided for them, including a growing number of jobs in the private sector. However, while substantial improvements in administration are noted, the report also points out that the program model continues to cause operational problems at a few of the sites.

PB81-108862 PC **A07**/MF **A01**
University of Southern California, Los Angeles. Ethel Percy Andrus Gerontology Center.
Housing: The Diverse Aged (Social and Cultural Contexts of Aging Project),
Fernando Torres-Gil, Deborah Newquist, and Mary Simonin. 1978, 128p NSF/RA-780766
Grants NSF-APR75-21178, DHEW-AOA-90-A-1297-01

Circumstances, problems, and needs for housing of the elderly are examined and analyzed using data collected in a 1973-74 survey of 1,269 older black, Mexican-American, and white Los Angeles residents. The manner in which these circumstances interface with government programs and policies is explained. The study deals with the elderly as a diverse group whose housing needs encompass the individual's life-style and cultural background in addition to basic shelter. The major findings include: (1) Housing is a serious problem for many older persons, specifically with respect to costs, home repairs, and neighborhood crime; (2) Higher percentages of elderly minority persons reported housing problems than whites; (3) Older persons living with their children experience a greater incidence of housing problems than those in any other living arrangement; (4) Older persons would prefer to repair their present housing than to relocate; and (5) More older persons indicated a preference for living in age-integrated settings than in age-segregated environments. This report seeks to aid future planning efforts involved in housing issues affecting our diverse elderly population.

PB81-109399 PC **A05**/MF **A01**
Southern California Association of Governments, Los Angeles.
Section 8 Existing Housing Inter-Jurisdictional Mobility Programs: A Resource Guide for Public Housing Agencies.
Rept. for Sep 78-Mar 80,
Joseph H. Carreras. Apr 80, 85p
Sponsored in part by Department of Housing and Urban Development, Washington, DC.

The Guide book describes the interjurisdictional use of the Section 8 Existing Housing Program within the SCAG planning area (Ventura, Los Angeles, Orange, Riverside, San Bernardino and Imperial Counties). The Section 8 mobility programs fall basically into three types: (1) Certificate Transfer programs; (2) Interjurisdictional Housing Services Agreements; and (3) Mobility Certificate Pools. Examples of implementing resolutions, agreements and an analysis of each type of cooperative arrangement is provided. In addition, special examples of programs designed to encourage mobility between jurisdiction containing high concentrations of lower income households (negative Fair Share) and those jurisdictions containing low concentrations of such households (positive Fair Share) are also described.

PB81-110041 PC **A11**/MF **A01**
New Mexico Univ., Albuquerque. Dept. of Economics.
Navajo Resources and Economic Development (A Report of the Southwest Region Under Stress Policy Project),
Philip Reno, and Allen V. Kneese. Dec 78, 245p
NSF/RA-780734
Grant NSF-AER75-16163

Major Navajo natural resources are recorded, inventoried, and reviewed as a means of using them for optimal benefit to the Navajo people. Demand for Indian energy resources is putting increasing strain on both tribal ownership of these resources and on the United States trust responsibility for them. The diminishing supply of energy resources and the rising energy demand affecting Indian communities also urgently affects much of the Southwest and West. This report covers renewable resources of rangeland, water, irrigated land and forests, and non-renewable energy resources of coal, oil, natural gas, and uranium. Additional subjects discussed include Indian economics, and the Navajo people, institutions, and resources. This information will be used to assess the impact of economic growth on this energy rich but ecologically fragile region. The text is amplified by maps, tables, and references.

PB81-110058 PC **A07**/MF **A01**
Economics Research Associates, San Francisco, CA.
Fees and Charges Handbook: Guidelines for Recreation and Cultural Agencies,
C. B. Jones, and S. M. Gold. Sep 79, 140p NSF/RA-790503
Grant NSF-DAR76-19341

This handbook for government and other decisionmakers illustrates how fees and charges can be used to increase the self-sufficiency of public agencies or nonprofit organizations in providing leisure and cultural services. It is intended to assist the consideration, establishment, and implementation of fees and charges that are appropriate and justified. The following subjects are discussed: (1) the benefits and issues which face agencies and organizations considering a new or expanded fee program; (2) the positive and/or negative impacts which might result from fees and charges; (3) a procedure for assessing the feasibility of imposing new fees or changing existing fees; and (4) considerations for implementing fee programs. Recreation and cultural facility administrators were interviewed to define significant issues and to review data sources. The information gathered as a result includes analysis of 27 case studies, a survey of 72 zoos, 155 museums, and 188 city and county recreation departments. A feasibility for a comparability analysis, a cost-revenue analysis, and a description and justification of fee changes are completed. A role playing game to simulate the decisionmaking process is described.

SHR-0002391 PC **A07**/MF **A01**
Union Graduate School, Baltimore, MD. Center for Minority Studies.
Social Services and the Black Aged: A Study of Availability and Utilization.
Thesis
Willamae S. Abrams. Nov 77, 140p
Submitted in partial fulfillment of the degree of Doctor of Philosophy, Union Graduate School, Balto., Md. Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0002391/ES.

This study of 50 black men and women deals with the availability and use of social services for the black elderly in Wilmington, Delaware. The study was designed to determine whether there was a low use of social services by elderly blacks and to question if the reasons for this were related to the attitudes and perceptions of blacks. The sample was chosen from 304 elderly blacks living in 5 high - rise complexes. Interviews were conducted with the sample and with 21 social service agencies. Collateral data were obtained from the United Way of Northern Delaware. One of the most salient findings about the sample was its homogeneity; subjects exemplified a commonality of behavior regarding the use of social services. On the basis of the findings, it is apparent that social services use (mainly legal, transportation, home care services, and senior center lunch programs) does not have a strong relationship to education, age, sex, household composition, voting participation, or other demographic characteristics. The low level of black use of social services may arise from the fact that city social service agencies rely on nonprofessionals to deliver the services. Moreover, there is evidence to suggest that the black aged and their families are short - changed by the local network of social services using Federal funds. This study should be repeated using a larger sample from all city high - rise apartments and comparisons should be made between high - rise apartment dwellers and the elderly who do not live in high - rise apartments. Finally, the elderly should be involved in (a) designing appropriate community services such as unstructured centers and crime watch programs, (b) delivering of services, and (c) training programs. An annotated bibliography, statistical tables, and documents related to the study are appended.

SHR-0002949 PC **A04**/MF **A01**
Organization for Services in the Public Interest, Newton Centre, MA.
Vermont Long-Term Care Project. Base-Line Audit Report to Governance.
Michael Baker, and Marilia Baker. Jun 77, 74p
Grant SRS-11-90415

Findings of the baseline audit conducted for the Vermont Long - Term Care System in March 1977 are documented. The purpose of the system is to operate, on a trial basis, a self - organizing human service system responsive to needs of elderly residents in two counties (Washington and Lamoille). The system will be self - sustaining if it has the capacity to respond to defined needs in the elderly population as they change over time and to encourage and sustain as a systematic basis the replacement of less productive with more productive human service technology, relevant to providing care for elderly community members. As viewed in the context of an organized human service system loop, important elements to audit in assuring system productivity and responsiveness are the community served, governance, the specification (documented statement of needs), the system manager, the system (programs, services, personnel, equipment, and procedures), and the community audit. The audit is a primary tool of governance in controlling system performance. The specification for guiding the audit considers the population served, need types, measures and limits of system accountability for each need type, system costs, constraints on system operation, procedures for validation and modification, and procedures for auditing. Data from the audit are presented as they pertain to medical care, mental health care, nutrition, isolation, recreation, shelter, employment, goods and services, income to meet basic necessities, transportation to basic services, and dependency. An overview of baseline audit procedures is appended, and supporting tables are included.

SHR-0002952 PC **A03**/MF **A01**
Texas Advisory Commission on Intergovernmental Relations, Austin.
Federal Human Service Programs and Joint Funding Simplification in Texas.
Jul 78, 43p

Joint funding of human service programs in Texas is examined, and special emphasis is placed on the potential use of the Federal model proposed in the Joint Funding Simplification Act of 1974. Major human service programs funded by the Federal Government pertain to income maintenance, child welfare, health services, mental health and mental retardation, and the elderly. The Joint Funding Simplification Act is intended to help State and local governments and other eligible recipients use Federal assistance more effectively by drawing upon resources from more than one program for the support of a common project. The Federal model has not been used for human service programs in Texas, and many barriers to its use relate to the organization of the service delivery system which is tied to the structure of State and local governments. State agencies administering Federal human service programs are the Governor's Committee on Aging, Texas Commission on Alcoholism, Texas Department of Community Affairs, Governor's Office of Criminal Justice Planning, Texas Department of Health, Texas Department of Human Resources, Texas Department of Mental Health and Mental Retardation, and Texas Rehabilitation Commission. A significant factor limiting

the number of human service programs in Texas suitable for joint funding is that about two - thirds of all programs are administered by a single Federal agency (DHEW). Another problem is that limited program funds come directly from the Federal administering agency to a local service delivery agency. Alternative methods of combining funds for program support are being used in Texas and, in some cases, these State - developed alternatives are more appropriate than the Federal model. Such alternatives include interagency grants and intergovernmental contracts, interagency contracts and intergovernmental contracts, intergovernmental grants and services, and interagency purchase or provision of services. It is clear that the joint use of Federal human service programs in Texas is not dependent on the Joint Funding Simplification Act. Federal joint funding does not appear to be a substitute for the consolidation of Federal categorical programs or the simplification of Federal administrative rules and regulations. Data on Federal financial assistance to Texas in 1977 are tabulated in an appendix.

SHR-0003409 PC **A04**/MF **A01**
Texas Univ. at Austin. Region VI Resource Center on Child Abuse and Neglect.
Manual for Using Abuse and Neglect Indicators and Index.
Phyllis Coombes, Maureen McCormack, Mary H. Chipley, Beverly Archer, and Jo Carol Norman. 1978, 65p
Grant DHEW-90-C-599

This manual for using abuse and neglect indicators and abuse indices provides step - by - step information needed to understand, use, or adapt the protection indicators to measure the impact of child protective services on abuse situations. Each index -- abuse, neglect, and sexual abuse -- is composed of physical indicators of the problem, such as a skull fracture diagnosed by a physician, combined with social and behavioral indicators that are statistically correlated. Evaluators can record the presence of these indicators before and after service delivery and can also arrive at a measure of the impact of protective services on children who receive them, i.e., a protective score. This approach can be used as a diagnostic or supervisory tool. It is a step towards developing a standardized measure that provides the user with more information for data assessment and aids in the communication of results and comparison of findings. The manual covers background on impact evaluation; the design of an indicator / index evaluation; training evaluators and pretesting the research design; data collection, analysis, and presentation; constructing a new index; and applications. Appendices list a data collection instrument, abuse and neglect indicators with operational definitions, formulas for abuse, neglect, sexual abuse, and program variables for use with the indicator / index approach. A glossary and bibliography are included.

SHR-0003471 PC **A04**/MF **A01**
Texas Joint Committee on Long-Term Care Alternatives, Austin.
Report on Statewide Hearings: A Public Response to Long-Term Care.
Technical rept. V
Sharon Flippen. 1978, 61p

In response to the mandate of Senate Bill 548 passed by the 65th legislature, the Joint Committee on Long - Term Care Alternatives conducted a comprehensive study of alternative care programs designed to serve elderly and disabled Texans. One component was the Statewide public hearings on long - term care alternatives. The hearings helped identify public concerns about long - term care and highlighted problems faced by elderly and disabled persons. Many recommendations were presented, although a consensus of opinion on solutions was not reached. The major concerns were stringent eligibility requirements; lack of coordination of services; State and Federal restrictions on Titles XVIII, XIX, and XX funds; and the need for adequate funding and provision of a continuum of community care services. Testimony was overwhelmingly in favor of community / home care for the elderly and handicapped. Eighty - eight percent of the witnesses specifically expressed support for community care programs. The majority viewed community care as necessary to maintain clients' independent functioning and less costly than institutional care. Both the elderly and handicapped voiced the desire to remain at home and made a plea for continuation and expansion of services that enable people to remain outside a nursing home. Stringent eligibility requirements, which deny access to needed health and home care services, were of paramount concern to a cross - section of those testifying. Requests for the elimination of barriers to needed home services recurred throughout the hearings. One of the most insistent themes was the need for coordination of service delivery at the local level. In testimony on the quality of care, witnesses voiced concerns about variance in standards for care within different community and institutional care programs, and the need for more training of personnel. Tables and appendices are included.

SHR-0003472 PC **A05**/MF **A01**
Texas Joint Committee on Long-Term Care Alternatives, Austin.
Longitudinal Study of Elderly SSI and Community Care Clients, 1976-1978 (Selected Findings).
Technical rept. I
1978, 78p

The data collected during the course of the Community Care of the Aged, Blind, and Disabled (CCABD) Program is examined in this report which is a result of a two - phase study of elderly Supplemental Security Income (SSI) recipients and CCABD clients living in a noninstitutional setting. The initial phase was completed in 1976. At that time, 4,177 elderly SSI recipients were interviewed throughout Texas. A 1978 followup survey, paralleling the 1976 version, was designed to examine key variables in a subsample of the original panel. A total sample of 1,764 individuals was selected. Both parts of the study examined how effective the CCABD program is and what effect is has on persons receiving nursing home care and the quality of that care, if community care is a suitable substitute for nursing home care, and if there is a continuing need for minimum level nursing care programs. Results show that the CCABD program is effectively obtaining its objectives. If all respondents brought under examination are placed along a continuum of self - sufficiency, ranging from nonclient status in both 1976 and 1978 to deceased in 1978, two characteristics -- age and number of tasks that can be performed without help -- explain position on or movement along this continuum. If the services provided through the CCABD program are placed in perspective with this continuum, it is clear that the services provided through the program are provided when needed and to those who need them most. There is also evidence that the CCABD program delays institutionalization. Findings from the survey of nursing home residents indicates that these recipients are distinctive in the prevalence of problems of mental instability to which the program addresses itself. The program is obtaining its objectives by serving those individuals who are very old, in delicate health, and with severe functional limitations. Without these assisting services, the maintenance of an independent, noninstitutional living arrangement would be in extreme jeopardy.

SHR-0003475 PC **A16**/MF **A01**
Employment Standards Administration, Washington, DC. Div. of Evaluation and Research.
Study of Handicapped Clients in Sheltered Workshops and Recommendations of the Secretary. Sheltered Workshop Study, Volume II.
Claude W. Whitehead, and Leonard S. Baker. Mar 79, 357p
Report from the Secretary of Labor to the Congress. See also Volume I, SHR-0002607; Appendix to Volume I, SHR-0002608. Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003475/ES.

Sheltered workshops offer severely handicapped individuals an opportunity to reduce their level of social and economic dependence by providing them with rehabilitation services and a chance to work within their own productive capacities. This report presents the findings of the second part of a comprehensive, nationwide study of sheltered workshops and handicapped persons involved in employment, training, and other programs provided by the workshops. Approximately 3,400 clients employed in workshops were interviewed, randomly selected through a stratified sample of 600 workshops. Designed as a supplement to the first workshop survey conducted in early 1976, this volume deals with the relationship between the client and the workshops, client characteristics, client services and activities, evaluation of services, and client earnings. Findings show that the typical client in a workshop in 1976 was a white, 25 - year - old, mentally retarded male who had never married and who lived in a dependent - type arrangement. Rehabilitation services were found to be the most important part of the workshop operation, with work being the medium to provide some of the services. Subcontract work was the most common type of work in the programs. Only a small portion of the clients were involved in manufacturing or service occupations. A majority of the clients indicated that the workshop experience was beneficial in moving them toward a goal of employment outside the workshop. The study showed that the level of severity of the workshops' handicapped workforce had increased substantially over the past decade, with the current population consisting primarily of persons handicapped by mental illness or developmental disabilities. This fact is believed to be one reason why the average hourly earnings of workers in sheltered workshops increased only 7 percent since 1968. Tabular data and technical notes are provided.

SHR-0003490 PC **A07**/MF **A01**
District Court Monitor, (U.S.), Boston, MA.
Report to the Court: March 12, 1979 – June 1, 1979.
Steven G. Horowitz. Jun 79, 128p
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003490/ES.

This written report is submitted in fulfillment of the requirement for semiannual reports to the U.S. District Court for the District of Massachusetts pursuant to the consent decrees issued in five class action suits. These suits concerned the civil and constitutional rights of mentally retarded citizens who have resided, or who are residing, at the five large State schools in Massachusetts. Being the first report to the court by the appointed Monitor, this document is not comprehensive, but serves as a review of those matters which the Monitor has been able to address in his first 2 1 / 2 months of duty. The consent decrees have two objectives: to provide a suitable living environment and to provide rehabilitation services, such as care, active treatment, training and education, for all members of the plaintiff classes. These two goals have the overall purpose of enabling each mentally retarded person to lead as close to a normal life as possible, and any interpretation of the decrees must be made with this understanding. This report contains five substantive chapters: residential environment, services, personnel, fiscal services and budgetary planning, and community placement. Due to the office's limited resources, the Monitor has been unable to describe the extent of the State schools' compliance with the requirement for space and furnishings, privacy, and sanitation. Although a complete inventory of compliance is not yet available, the monitor has been able to ensure that the capital renovation process will move forward in a prompt and suitable manner. Additional chapters concern the monitor's conception of his role, recommendations which will form the basis of the monitor's actions, and information on deadlines.

SHR-0003496 PC **A02**/MF **A01**
National Inst. of Mental Health, Rockville, MD., Div. of Mental Health Service Programs.
Comprehensive Community Support Systems for Severely Mentally Disabled Adults. Definitions, Components and Guiding Principles.
Judith Clark Turner. 29 Jul 77, 11p
Paper summarizing proceedings of two-day conference held in January 1976.

The proceedings are summarized of a 2 - day working conference on community support systems held in January 1976 under the auspices of the Division of Mental Health Service Programs, National Institute of Mental Health. The conference was designed to articulate goals, principles, and terminology that would be useful in planning and evaluating community - based service systems for adults with seriously disabling mental health

problems. The presentation reflects extensive comment from the field and also incorporates input from subsequent working conferences held under National Institute of Mental Health auspices. The conceptual framework set forth here is now being used by the Division of Mental Health Service Programs to guide planning and policy development concerning the severely or chronically mentally disabled. This paper serves as a guideline for a pilot program -- the Community Support Program (CSP) -- initiated in the fall of 1977. Major divisions of the paper treat (1) a general definition of a community support system, (2) definition of the CSP target population, (3) functional characteristics of the CSP population, (4) basic and special needs of the CSP population, (5) essential components of a community support system, (6) conditions necessary for constituting a system, and (7) guiding principles for community support systems. The quality of the service system can be evaluated by means of the following guiding principles: personal dignity assured for clients, client self - determination, normalization, individualization of services, least restrictive setting, comprehensiveness, coordination, availability and accessibility, flexibility, developmental programming, continuity of supportive relationships, nondiscrimination, confidentiality, gradualism, natural support systems, mutual - help and self - help, and community accountability.

SHR-0003501 PC **A03**/MF **A01**
Boston Coll., Chestnut Hill, MA. Graduate School of Social Work.
Common Set of Definitions.
Jan 79, 26p
Grant OHDS-84-90406

A common set of definitions for Title XX services is found in this booklet. The service descriptors were prepared from a study conducted by Boston College Graduate School of Social Work under a grant from HEW. The definitions, program elements, and activities of the Title XX services were derived in collaboration with Title XX planners and staffs in 48 States and the District of Columbia. Under each Title XX service listed, a service definition, program elements, and activities are presented. The service definition refers to the overall description of activities provided by the designated State agency to persons in need; program elements are major steps involved in providing a given service; and activities are the particular actions performed by a worker in order to provide a given service. United Way staff in the capital cities of each of the States conducted personal interviews and worked with the Title XX staff in the establishment of the common set of definitions. Common service definitions are provided for the following Title XX services: adoption, chore (assistance with household tasks for the disabled or elderly), community - based residential care and treatment, counseling, day care (adults), day care (children), education for daily living, education for employment, emergency shelter, family planning, foster care (adults), foster care (children), health related / support services, home delivered and congregate meals, homemaker, home management, housing information and referral, legal, protective (adult), protective (children), transportation, and recreation, enrichment, and reassurance.

SHR-0003505 PC **A05**/MF **A01**
Florence Heller Graduate School for Advanced Studies in Social Welfare, Waltham, MA. Levinson Policy Inst.
Regulation of Homemaker-Home Health Aide Services.
Emily Layzer. Dec 77, 77p

The growth in homemaker - home health aide services from 600 in 1966 to an estimated 3,675 programs in 1977 has not been matched by an increase in regulatory safeguards. As home health care becomes an alternative and complement to nursing home and hospital care, government, consumers, providers, and representatives of health and social services must cooperate in developing standards, uniform systems of cost accounting, and clearly defined outcome measures before major regulatory mechanisms can be addressed. Given the lessons learned from regulation in private industry, it is essential that decisionmaking issues of cost, entry, and exit of services be left to the decentralized, competitive marketplace for now. Internal utilization review procedures should be encouraged to evaluate the quantity and appropriateness of all services delivered, at least until effective outcome measures have been developed. Quality assurance should use minimum performance standards tied to Federal reimbursement mechanisms, the accreditation process, and State licensure, with all providers held accountable to one set of standards. Various accreditating bodies should work together to develop one unified system of self - regulation, while State licensing bodies should tailor their guidelines to a Federal model. Finally, the home health field should maintain indirect proprietary provision under Titles XVIII and XIX and screen for hidden profits in the nonprofit sector. Only through the promotion of sound markets and monitoring systems which maintain the viability of free market operations will homemaker - home health aide services achieve integrity, competence, and recognition as full partners in the health and welfare system. An extensive bibliography is supplied. Portions of this document are not fully legible.

SHR-0003506 PC **A03**/MF **A01**
Florence Heller Graduate School for Advanced Studies in Social Welfare, Waltham, MA. Levinson Policy Inst.
Improving the Provision of Non-Institutional Long-Term Care to the Elderly.
Alan Sager. Dec 78, 42p
Revision of paper prepared for the AAAS Intergovernmental Science Engineering and Technology Advisory Panel's Workshop on Health and Human Resources: The Elderly.

Steady and rapid spending on long - term care, particularly on nursing homes, has seriously concerned Federal, State, and local legislators and administrators. Either new funds must be secured, or funding now spent on institutional care will have to be diverted. Problems in improving noninstitutional long - term care, in addition to fund - raising, include knowing what to do in deciding on needed services; knowing how to finance, organize, and administer such services; determining the roles of professionals, patients, and families in making decisions; and providing long - term care consistent with elderly needs. To date, the impacts of most types of research on noninstitutional long - term care policy have not been great, either because of legislative disappointment in the low reliability of cost estimates, the influence of journalistic accounts of patient abuse or fraud, or the political tendency to broadly diffuse benefits to the elderly, rather than target them to the dependent and impoverished. Some possible policy options, however, might include expanded funding for case management and expansion of home health benefits under Medicare. Further research is needed to explore other possible options to innovative long - term care, and existing mechanisms, such as assessment and care planning techniques, could be transferred to operating agencies. Research on costs and effects, on communal living and on the decoupling of income and work should also be explored. Footnotes are provided.

SHR-0003522 PC **A05**/MF **A01**
National Association of State Mental Retardation Program Directors, Inc., Arlington, VA.
Minimal Array of Essential Services for Mentally Retarded Persons: An Analysis of Consumer and Provider Opinions.
Summary rept.
Robert M. Gettings, and Deborah Mitchell. Mar 79, 77p

Results are reported from a study to determine the level of agreement among consumer and provider interest groups regarding the minimal kinds of essential services for mentally retarded persons. While study findings show a significant degree of consensus about the grouping of services into categories, there are differing views about the priorities that should be given service elements within the service array. Estimates of the importance of the case - finding function by respondent groups show that State officials believe improved services to existing clients deserve priority over locating unserved and underserved retarded persons. The Association of Retarded Citizens executives apparently disagree with this assessment. A lack of consensus on this issue could affect the setting of goals for change. The inclusion of three individualized program planning services in the minimal array of services is characteristic of the current movement from institutional to community - based services. However, differences in the views of providers and consumers about the relative importance of these services may pose barriers to service implementation. The task before the President's Committee on Mental Retardation, for which this report was prepared, and other national organizations concerned with helping the mentally retarded is to facilitate the development of a national consensus. This consensus is essential to mobilizing the human and financial resources necessary for progress. The appendices provide a list of initial service descriptors, a rank ordering of service statements by service providers and consumers, and a cumulative rank ordering of service statements by all respondents. A selected bibliography is provided. Tables and diagrams are provided.

SHR-0003524 PC **A17**/MF **A01**
Washtenaw County Coordinating Council for Children at Risk, Ann Arbor, MI.
Child Abuse and Neglect and Youth Involved with the Law. Washtenaw County Juvenile Justice Services Needs Assessment and Plan.
May 79, 399p
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003524/ES.

This report encompasses a broad range of services in Washtenaw County, Mich., relevant to the prevention and treatment of child abuse and neglect and youth involvement with the law. The contention is that service delivery decisions should consider the resolution of these problems as well as the care of persons who are already members of the two target populations. Responses to the child abuse and neglect needs assessment survey were received from 75 persons in 28 different agencies. Responses to the youth involved with the law needs assessment survey were received from 53 persons in 19 different agencies. Information in the child abuse and neglect service plan pertains to the processing of reported cases, supportive / preventive services (counseling, legal and advocacy, health, education, out - of - home, basic, employment, transportation, recreation, and indirect services), and the coordination of services for child abuse and neglect. The service plan for youth involved with the law covers the juvenile justice system and its outcomes (interaction between the community and the system, the processing of youth by law enforcement agencies and the juvenile court, youth processed by the court probation department, and youth processed by the Michigan Department of Social Services), supportive and preventive services (counseling, advocacy, health, education, out - of - home, basic care, employment, transportation, and recreation services), and the coordination of services for youth involved with the law. Narrative and tabular data on specific services and resources available in Washtenaw County to aid in the eradication of child abuse and neglect and youth involvement with the law are provided. Appendices contain additional information on service providers and community groups contacted in the surveys, an annotated bibliography, and a sample of 1977 petitions filed in the county juvenile court.

SHR-0003525 PC **A04**/MF **A01**
Washtenaw County Coordinating Council for Children at Risk, Ann Arbor, MI.
Sharing Information About Clients: Confidentiality and Privileged Communication in Child Abuse, Neglect and Juvenile Delinquency.
Donald N. Duquette. 1977, 71p

Limitations and modifications of the professional's legal duty to preserve the confidence and privacy of clients are discussed. If a professional has confidential information about a client, he or she may share it with others if there is a valid Consent for Release of Confidential Information regarding that information. A professional may share certain confidential information under the following circumstances: (1) when professionals are mandated by law to report cases of suspected child abuse or neglect and to testify in court when the information is directly related to inadequate mental or physical care of a child and (2) when the sharing of information between professionals in an agency and among consultants is necessary for the benefit of

the client. An initial contract with a client may preserve or set aside all or part of a duty to preserve confidences. The risk of a successful lawsuit for breach of confidentiality is slight. The appendices provide a collection of statutes creating privileged communication and confidentiality for various professions in Michigan and present recommendations for policy and procedures regarding confidentiality. References are provided.

SHR-0003541 PC **A02**/MF **A01**
National Inst. of Senior Centers, Washington, DC.
Senior Center and the Community Care System.
Lorraine Lidoff. Jul 79, 22p
Grant AOA-90-A-1736

This paper creates a framework for understanding the potential role of the senior center in a total community effort to address the needs and concerns of older people. The community care system is the total effort a community makes to support its older residents. It includes natural supports (families, friends, neighbors) and formal supports (programs and services offered by public and private agencies, organizations, professional, and volunteer groups). The success of the community care system is determined by the continuity of response to older people's needs and by its flexible array of supports that change as people's needs and choices warrant. Such continuity requires that the formal system be designed to complement the natural supports as needed. The system should provide for chronic needs, but it should also focus on older people's strengths, providing restitution for losses and support for new gains. The role of these centers can be enhanced by giving careful attention to the viewpoints and needs of older people, and the perspective of the community care system (senior center and system coordination, natural supports, and the formal support network). The senior center is a physical focal point for older people, a social institution designed for and by them. In a community with few resources, the center can take on a much larger service delivery role. With the support of area agencies on aging, public officials, planners and funders, the senior center can greatly enhance the total community effort to serve older people. Tabular data are included.

SHR-0003543 PC **A10**/MF **A01**
Nevada Legislative Counsel Bureau, Carson City. Legislative Commission.
Administration of Mental Hygiene and Mental Retardation Programs in Nevada.
Oct 78, 206p BULL-79-6
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003543/ES.

The 1977 session of the Nevada legislature adopted a resolution that directed the Legislative Commission of the State Legislative Counsel Bureau to study the statewide administration of mental hygiene and mental retardation programs. A subcommittee was appointed to conduct the study, and a task force of mental health professionals was organized in response to the subcommittee's need for professional input to the study. Focusing on Nevada's Division of Mental Hygiene and Mental Retardation, organized under the Department of Human Resources (the umbrella agency over divisions involved in a wide range of social services), findings indicate that the division exists as a group of independent and autonomous agencies coordinated by an isolated administration. This structure has evolved as programs have expanded. According to a proposal presented to the 1977 legislature, the division planned to reorganize mental health services on a regional basis. The legislature rejected the proposal, and the task force concurred in the move against regionalization. Major deficiencies, cited by the task force, in the administration of the division include the lack of priorities with a clear and integrated assignment of mission and responsibilities to programs, inadequate coordination in the delivery of mental health services, and absence of needed management information. Recommendations were made for the improvement of mental health services in six areas: (1) entry into the mental health system and the coordination of services and long - term care; (2) treatment of patients who represent a management problem or a security risk (adults and adolescents); (3) availability of major mental health treatment approaches; (4) staffing requirements, qualifications, and training; (5) mental health program evaluation; and (6) mental health administration. Appendices provide further information on report recommendations, programs of the division, funding and capital improvements of the division, and employee training. Recommended legislation pertinent to mental health services in Nevada is noted.

SHR-0003548 PC **A05**/MF **A01**
Pueblo Area Council of Governments, CO. Urban Transportation Planning Div.
Transportation Options for the Elderly and Handicapped of Pueblo.
Jul 79, 79p

Conducted to aid the development of a transportation system to adequately serve the elderly and handicapped population of Pueblo, Colo., this study consisted of a survey of 189 agencies involving types of transportation services for the elderly and handicapped, a demographic analysis of the Pueblo area, projections of elderly and handicapped populations for the next 20 years, and analysis of travel patterns of the target population. A number of inadequacies or gaps can be cited particularly with regard to restricted passenger coverage, limited service capacity, scheduling and dispatching procedures, inadequate facilities, lack of uniform operating data, and inefficient route assignments. An array of service alternatives are proposed to close these gaps. A single purpose system whose transportation vehicle operates between one or more origins to one destination, a fixed route system (transportation supplied along an established route at pre-determined times) which is used by most public transportation systems, and personalized service, possibly requiring advance registration for pickup or operating on a demand - response basis are mentioned as options and discussed in terms of accessibility and effectiveness in getting a client to a precise destination. Organization and operational alternatives possible for offering special transportation services to the target group include accessible bus, subsidized taxi, public - operated paratransit, and private, nonprofit paratransit. When all of these options were evaluated on the criteria of funding availability, quality of service, legal considerations, and cost approximations, results showed private, nonprofit paratransit to have the greatest potential for meeting the needs of the disadvantaged. Study data and recommendations are provided.

SHR-0003566 PC **A02**/MF **A01**
Texas Advisory Commission on Intergovernmental Relations, Austin.
Initiative and Referendum: An Informational Report.
Louise H. Winecup. Jun 79, 18p
This Intergovernmental Report is part of an informational series by the Commission.

This report by the Texas Advisory Commission on intergovernmental relations describes initiative and referendum procedures as they have operated in States other than Texas. The report outlines technical considerations of interest to any State considering the adoption of these methods of direct legislation. Technical issues involved in the adoption of initiative include the geographic distribution of petition signers, legislative review sessions, limitations on subject matter, preliminary filing procedures, time restrictions, voting requirements, and legislative ability to amend or repeal a citizen - initiated statute. Other technical issues, arising for both processes, are competing propositions on the ballot, timing of elections, petition sponsorship, and disclosure of campaign funds. A study of initiative and referendum also leads to two seemingly contradictory observations. Despite continued discussion over the years, there has been little movement toward a resurgence of instituting the processes of initiative and referendum by those States that do not have them. However, no State which has instituted them has later removed the processes from the governmental structure. One conclusion is clear -- if a State decides to place an initiative and referendum process on the ballot, technical issues involved should be given careful and thorough consideration. Tabular data are included.

SHR-0003583 PC **A03**/MF **A01**
Washington Univ., Seattle. Center for Social Welfare Research.
Implementing the Washington State Social Service Delivery System.
Richard Weatherley, Claudia Byrum, Denise Lishner, Kelley Reid, and Grant Roset. Jun 79, 40p

Results of a study on the Washington State Social Service Delivery System (SSDS) are presented. The research was conducted to assess the impact of the organizational changes on frontline staff and clients, as well as the efficacy of the change process itself. The research was viewed by project administrators as part of the implementation process; the study illustrates the difficulty in implementing policy in a constantly changing environment. Report information is based on interviews with frontline administrative social service staff and related data. Study results showed that frontline social service staff maintain considerable employment stability; for the 14 percent sampled, the average length of employment was 8 1 / 2 years, 12 1 / 2 years for supervisors. Staff members consider their jobs to be both interesting and valuable. However, workers and supervisors feel that paperwork requirements are excessive and in most cases, unnecessary. In addition, both workers and supervisors seek policy clarification from their immediate supervisors. Prior to the issuance of the new SSDS manual, the social service manual was relied upon infrequently because of its unclear and dated information. The staff tends to see itself as beleaguered by a large, insensitive bureaucracy concerned more about accountability than service to clients. Approximately half of the staff anticipated negative consequences from the SSDS plan, including greater restriction on services. Based on these findings, it appears that a participatory strategy is most appropriate for implementation of SSDS plans. Information about systems components, status reports, and training materials should stress the important role of frontline and midmanagement participants. Increased staff participation coupled with more responsive project management is recommended. Reference notes and tabular data are provided.

SHR-0003671 PC **A05**/MF **A01**
Washington State Dept. of Social and Health Services, Olympia. Planning and Research Div.
Productivity Measurement in State Human Service Programs: Foster Care Report.
Charles A. Lund. Jun 78, 80p
Grant NSF-APR75-19597

This study examines the effects of a special training program for caseworkers and specialized foster care service units on the outcomes of foster care cases. Eleven offices providing foster care services and their clients participated in the study. Data regarding length of stay, number of placements, number of entries into care, and final outcome were collected on foster care clients during the study year and during a comparable period 2 years prior to the study. Seven offices participated in a portion of the study requiring daily contact with caseworkers by project staff in determining caseworker activities in various program areas. Caseworkers from these offices also were required to specify a case plan on a portion of their foster care cases. The 11 offices were found to vary widely in terms of costs and effectiveness. Yet, the major findings were that training and specialization exerted no effect on outcome. However, the seven offices which participated in the portion of the study requiring daily contact with caseworkers and specifying case plans had a shorter mean length of stay and a higher percentage of cases returning home. Cost estimates of specialized and unspecialized offices revealed no cost differences. A cost analysis of the training program showed that salaries of those attending constituted a sizable expense category. Data related to caseworker activities indicated that offices did not differ in foster care activities of caseworkers as a function of any combination of specialization and training. Appendices include tabular data as well as a description of programs and activity categories used in the work sample portion of the study. (Author abstract modified)

SHR-0003683 PC **A07**/MF **A01**
Prototypes for Modeling and Simulation of Social Service Issues.
Meyer Katzper. Jun 79, 136p

This series of prototypes using day care issues was proposed for the Office of Human Development Services (OHDS) to demonstrate the feasibility of modeling and simulation as a policy analysis tool. An OHDS modeling experiment used the Systems Dynamics approach, which allows study of a system's behavior over time and the inclusion of feedback of effects and nonlinear interactions. A series of models was implemented in the DYNAMO simulation language. The general components stressed in the modeling process included defining the issue; stating the questions; determining the factors; identifying the elements, variables, and parameters; exploring and formulating relationships; developing hypotheses; establishing formal, logical, and mathematical relationships; writing the program; specifying the data and parameters; experimenting with simulations; analyzing the results; and rerunning the program with variations. This modeling process was applied to the following day care issues: (1) accounting, funding, and services; (2) costs and facilities; (3) tabulation with variations in funding, regulations, and utilization; (4) graphical representation of regulatory effects; and (5) regulation and service cost and supply. These models are advocated as OHDS analytic aids. Although there was initial enthusiasm and participation in the use of modeling and simulation during the experiment, there was insufficient followthrough in terms of participation in the actual modeling and simulation. At its best, a model is developed in a participatory manner. Extensive diagrams and charts illustrate the text. Appendices contain descriptions of five FORTRAN models and the two DYNAMO models, along with program listings in DYNAMO and sample input and / or sample output for each of the models. References are provided.

SHR-0003706 PC **A10**/MF **A01**
Columbia Univ., New York. Clinical Scholar Program.
Mental Health and Rural America: An Overview and Annotated Bibliography.
James W. Flax, Morton O. Wagenfeld, Ruby E. Ivens, and Robert J. Weiss. 1979, 225p DHEW/PUB/ADM-78/753
Contracts PHS-PLD-07223-77, PHS-PLD-07224-77
Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003706/ES.

The problem of rural mental health is addressed from both sociocultural and medical perspectives. The book's first section places the mental health problems and programs of rural areas in a broad conceptual perspective. Demographic characteristics, barriers to the delivery of services, and the organization of existing service systems are discussed in some detail. Special consideration is given to the clinical aspects of rural delivery and to particular personnel issues such as training, recruitment, and continuing education requirements. Throughout the text, references appear to works cited in the second section, the annotated bibliography. The bibliography is based on an extensive literature review covering medicine, psychiatry, psychology, nursing, sociology, and social work. More than 360 entries deal with a variety of conceptual and programatic issues. The United State Census Bureau standard definition of rural is those people who live in towns or areas with fewer than 2,500 persons. According to the 1970 census, 26.5 percent of our population is rural. On the broadest possible level, rural values tend to differ from urban orientations in that rural residents believe in man's subjugation to nature, fatalism, and the basic evil of human nature. Understanding these differences is vital to all professionals working in rural areas since lack of understanding is often the source of rural community resentment towards agency efforts. The most pervasive barrier to health services delivery in rural areas is the middle - class nature of the agency. Footnotes, references, and an author index are included in the work.

SHR-0003851 PC **A03**/MF **A01**
InterAmerica Research Associates, Washington, DC.
Migrant Child Welfare: A State of the Field Study of Child Welfare Services for Migrant Children and Their Families Who Are In-Stream, Home-Based, or Settled-Out.
Executive summary
David N. Cavenaugh, Linda Jones Lynch, Sandra McClure Porteous, and Henry A. Gordon. Jun 77, 47p
Contract DHEW-105-76-1140
See also related documents, SHR-0003762; SHR-0003763. Executive Summary available from PROJECT SHARE, P.O. Box 2309, Rockville, Md. 20852 as SHR-0003851/ES.

The migrant child welfare study identifies and presents programs serving the needs of migrant families and problems in improving services to more adequately address migrant family needs. The study finds a critical shortage of data available on social services to migrants, and it concludes that social services are seldom provided to migrant families to the same extent as to other populations. Child care and health services are more widely available but still meet only a fraction of the need. The study includes a review of the literature, a survey of programs to train farmworkers in services to migrants, interviews with approximately 800 migrant families, and agency interviews in 12 States. Exemplary programs are identified which currently serve migrant children and their families through child care, health, education, and outreach services. The study also highlights a need for increased local level coordination of services. The study culminates in three reports including this executive summary, finding that the uniqueness of migrants (their poverty, cultural and language differences, and traveling) present a test case for social service agencies which purport to serve clients equally. A national program is needed, with a Federal coordinating panel, to ensure that programs targeted for the benefit of migrant farmworkers and their families operate effectively and efficiently. Recommendations are given for policy, administrative, and programmatic improvements that take into consideration the complexity of social service provider systems, the need for coordination, and structural alterations for short - term and long - term change.

SHR-0004230 PC **A04**/MF **A01**
Wisconsin Univ.-Madison. Inst. for Research on Poverty.
Administration and Organizational Influences on AFDC Case Decision Errors: An Empirical Analysis.
Irving Piliavin, Stan Masters, and Tom Corbett. Aug 79, 54p DISCUSSION PAPER 542-79
Grant SRS-11-90165

The potential influence of Aid to Families with Dependent Children (AFDC) case decision errors on worker, supervisory, and agency performance is assessed. Public assistance programs in Wisconsin were studied to evaluate worker, client, and agency factors associated with errors in AFDC budgetary and eligibility decisions; to identify worker, client, and agency factors related to delays in AFDC intake and budgetary decisions; to ascertain the interdependence of delays in budget decisions and errors; and to assess conditions leading to and consequences of the failure of AFDC applicants to follow through on their applications. Both intake and postintake decisions and decisions to deny or provide assistance were examined. Measures of error used in the analysis were overpayments and underpayments. A conceptual model was devised to explain welfare case decision errors. Over 1,500 items of information concerning case, agency, and public official attributes were collected to make linkages between potential error sources. The case sample consisted of 5,014 AFDC cases reviewed by Wisconsin quality control personnel during calendar years 1975 - 1976. It appeared that case payment decisions of public welfare personnel were not independent of their attitudes and values. Personnel with generally liberal views were more likely to make overpayments or less likely to make underpayments. There was a positive relationship between various management options and error reduction, such options including the use of monitoring and control mechanisms, increased specialization of case aide workloads, provision of support services to case aides, establishment of work conditions conducive to increased job satisfaction, and appointment of supervisors expressly committed to error control. Organizational structure and process characteristics had relatively little influence on payment errors, with structure and process referring to phenomena like centralization, formalization, work group cohesion, and peer interaction. Supporting data are tabulated. Variables in the conceptual model to explain case decision errors are noted in an appendix. Notes and references are included.

SHR-0040045 PC **A07**/MF **A01**
Community Crisis Center, Inc., Elgin, IL.
Shelter Experience. A Project of the Region 5 Technical Assistance Center.
Oct 79, 132p
Grant ACTION-137-0106/1
Guide to shelter organization and management for groups working against domestic violence.

Based upon the experiences of The Community Crisis Center in Elgin, Ill., detailed, practical guidance is provided for starting, structuring, and operating a center to help abused wives and children. Grassroots leadership is assumed for the starting of a center to aid victims of domestic violence. Steps for gaining support from significant community leaders and the community itself are described. Factors to be considered in the selection and purchase of a facility are indicated, and funding and business management procedures are described. The program is designed to provide information and referral, crisis intervention and counseling, case management, advocacy, support, and community education. Problem areas likely to occur in staffing are identified, and job descriptions are provided for a case / manager counselor, executive director, assistant director, volunteer coordinator, and advocate / advocacy program. The discussion of procedures from intake to followup deal with the client initial contact, the intake procedure, evaluation of client progress, release procedures, and followup planning. Sample forms to be used at various stages in the process are provided. Housekeeping responsibilities and scheduling are described and illustrated in a sample schedule. The volunteer program and procedures followed in handling abused children are also discussed. A bibliography is included.

SHR-0040062 PC **A02**/MF **A01**
Brooklyn Legal Services, NY.
Relationships Between Early Pregnancy, Early Marriage Education and Wife Beating.
Rioghan M. Kirchner. 1978, 13p

Early pregnancy, early marriage, and the wife's educational level are examined as possible factors in wife beating. The sample of 600 women studied was the total population of female clients of the Family Law Unit of Brooklyn Legal Services from May 1976 to May 1977. The population was limited to women who had decided to leave their husbands and excluded financially independent women, since they would not require free legal services. The population, however, was varied in social and cultural background, religion, education, and ethnicity. The instrument used was a structured interview based on a questionnaire. Of the 600 women interviewed, 357 (59.5 percent) were beaten by their husbands during their marriage (beating defined as repeated physical violence causing physical and emotional damage). The hypothesis that early pregnancy tends to produce wife beating was supported by the findings: there is a 20 - percentage - point difference between beaten and unbeaten women who became pregnant early in marriage. Presumably, early pregnancy would be a factor creating emotional and financial stress in the relationship. There appears to be no correlation between age at entering the marriage and marital violence. The hypothesis that women with higher educational levels are more likely to be beaten than those with less education appears to be true. Possibly, women with the least education are less threatening to their husbands. Tabular data and references are provided. (Portions of this report are not fully legible.)

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

AD-A089 282/8 PC **A03**/MF **A01**
Air Force Academy CO
A Survey of Glutamine Synthetase Activities in Tissues from Three Classes of Fish.
Research rept.,
James T. Webb. Sep 80, 26p Rept no. USAFA-TR-80-10

Enzyme assays using the gamma-glutamyl transferase method provided estimates of glutamine synthetase activity in tissues from 18 species of fish. These species included Chinook salmon, Pacific herring, carp, channel catfish, Pacific hagfish, ratfish, spiny dogfish, copper rockfish, Pacific cod, fresh-water and salt-water stingray, and Pacific lamprey. Glutamine synthetase activity in liver and kidney from the classes Chondrichthyes, Cyclostomi and Osteichthyes related to each species' need for glutamine. Brain activity was relatively high in all species. Gill and other tissues had very low but detectable glutamine synthetase activity. (Author)

AD-A089 462/6 Not available NTIS
California Univ Berkeley School of Public Health
Isoelectric Focusing of Mosquito Esterases in the Presence of Triton X-100,
E. J. Houk, and J. L. Hardy. 20 Aug 79, 1p
Contract DAMD17-77-C-7018
Availability: Pub. in Experientia, v36 p675 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

N80-32056/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
The Influence of Modulated Sinusoidal Current on the State of Chromatin from Neurons of the Cerebral Cortex of Rats in Hypokinesia.
Z. A. Sokolova. May 80, 10p NASA-TM-76160
Contract NASW-3198
Transl. Into English from Vop. Kurortol., Fizioter. Lech. Fiz. Kul't (USSR), No. 1, Jan. - Feb. 1978 p 56-59. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The biochemical changes under the influence of modulated sinusoidal current in the central nervous system were investigated. The methodology used is discussed, the results are reported in a table, and conclusions are presented.

N80-32057/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effect of Sinusoidal Modulated Currents and Acute Hypoxia on Corticosterone Content and Activity of Certain Dehydrogenases in Tissues of Different Rat Organs During Hypokinesia.
L. L. Melik-aslanova, and I. D. Frenkel. May 80, 12p NASA-TM-76161
Contract NASW-3198
Transl. Into English from Vod. Kurortol., Fizioter. Lech. Fiz. Kulit. (USSR), No. 1, Jan. - Feb. 1978 p 59-65. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prepared by Central Inst. Of Health Resort Treatment and Physical Therapy, Moscow.

The state of hypokinesia in rats was reproduced by keeping them for 30 days in special box cages that restricted their mobility in all directions. Results show the resistance to acute hypoxic hypoxia is increased. This is linked to the considerable rise in the reduced level of corticosterone in different organs and the succinate dehydrogenase activity in the liver and brain. The letter indicated the primary oxidation of succinate, which has great importance in the adaptation of the oxidative metabolism to acute oxygen insufficiency. The use of sinusoidal modulated currents in the period of hypokinesia promotes normalization of the indices for resistance of the rats to acute hypoxia.

N80-32058/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
The Dynamics of Certain Indicators of Nuclein Metabolism During Hypokinesia in Rats of Different Ages under the Influence of Sinusoidal Modulated Currents and Measured Physical Load.
Z. A. Sokolova. May 80, 9p NASA-TM-76162
Contract NASW-3198
Transl. Into English from Vop. Kurortol., Fizioter. Lech. Fiz. Kulit. (USSR), No. 5, Sep.-Oct. 1977 p 67-70. Transl. By Scientific Translation Service, Prepared by Central Inst. Of Health Resort Treatment and Physiology, Moscow.

The influence of sinusoidal modulated currents was studied and physical loads on the nucleic acid content and the nucleotide composition of the total RNA in muscles of rats of various ages under conditions of hypodynamia were measured. Methodology utilized is described and conclusions are presented.

PB81-108573 PC **A02**
California Univ., San Diego, La Jolla. Inst. of Marine Resources.
Three New Vinyl Acetylenes from the Marine Red Alga 'Laurencia',
Bruce M. Howard, Gary R. Shulte, William Fenical, Barbara Solheim, and Jon Clardy. 9 Aug 79, 6p NOAA-80090810
Grant NOAA-04-7-158-44121
Pub. in Tetrahedron, v36 p1747-1751 1980. Prepared in cooperation with Cornell Univ., Ithaca, NY. Dept. of Chemistry.

The structures of three new halogenated vinyl acetylenes are described which are natural products from various species of the red seaweed Laurencia. The structure of chlorofucin isolated from Laurencia snyderae was determined by X-ray diffration analysis. Poiteol was isolated from Laurencia poitei and its structure was also determined by single crystal X-ray diffraction experiments. The structure of obtusenyne was based on a combination of chemical and spectral methods.

PB81-109589 PC **A02**
California Univ., San Diego, La Jolla. Inst. of Marine Resources.
Bifurcarenone, an Inhibitor of Mitotic Cell Division from the Brown Alga 'Bifurcaria galapagensis',
Hao H. Sun, Nancy M. Ferrara, Oliver J. McConnell, and William Fenical. c1980, 5p
NOAA-80090809
Grant NOAA-04-7-158-44121
Pub. in Tetrahedron Letters, v21 p3123-3126 1980.

A C27 hydroquinone, bifurcarenone, apparently produced via mixed biosynthesis, has been isolated from the brown seaweed Bifurcaria galapagensis (Cystoseiraceas). The structure of bifurcarenone was determined by chemical and spectral methods, and this compound was found to exhibit antibacterial properties, as well as to inhibit cell cleavage of the fertilized egg from the urchin Strongylocentrotus purpuratus. (Copyright (c) Pergamon Press Ltd. 1980.)

6B. Bioengineering

AD-A089 446/9 PC **A05**/MF **A01**
Michigan State Univ East Lansing Dept of Biomechanics
The Accuracy of Screw Axis Analysis Using Position Data from Anatomical Motion Studies.
Annual rept. 1 Nov 78-31 Oct 79,
Jeffrey H. Marcus. 5 May 80, 81p AFOSR-TR-80-0868
Contract F49620-78-C-0012

Research involving the kinematics of human joint mobility often involves screw axis analysis. As a prelude to such research a screw axis analysis program was developed and implemented for use in the Systems Anthropometry Laboratory. This report presents a detailed discussion of the algorithm used to find Displacement Matrices (DM) and screw axis parameters. Error propagation due to uncertainty in DM is analytically developed and then demonstrated. The rotation angle is found to be the most critical screw axis parameter, and the components of a unit vector in the direction of the screw axis are the most sensitive to error. Using the condition number of a matrix, a method is developed and presented for evaluating the error propagation due to the matrix operations used to find DM. (Author)

PB81-109381 PC **A13**/MF **A01**
Saint Elizabeth's Hospital, Brighton, MA.
Development of Percutaneous Energy Transmission Systems.
Annual progress rept.,
Benedict D. T. Daly, Michael Szycher, Michael Worthington, Victor L. Poirier, and Roger G. Warren. 11 Jun 80, 290p NIH-N01-HV-8-2919-2
Contract N01-HV-8-2919
See also PB-299 739.

A composite percutaneous energy transmission system designed to transmit energy to intracorporeal blood pumps is being developed. This system utilized polytetrafluroethylene (PTFE) to provide a connective tissue-biomaterial seal limiting epidermal migration and sinus formation. Eight iterations have been evaluated in vivo. These studies have demonstrated that PTFE will support ingrowth and that this ingrowth limits epidermal migration. The interface is protected by a polyester velour covered skirt which provides strain relief and this must be implanted subdermally. Mobility of the tissues surrounding the device is important to allow displacement which provides additional strain relief. A semiquantitative swab culture technique predicts incipient infection. Nutritional deprivation adversely affects biomaterial tissue interactions.

PB81-113169 PC **A11**/MF **A01**
Children's Hospital Medical Center, Boston, MA. Cardiovascular Surgical Research Lab.
The Clinical Applications of the Left Ventricular Assist Device.
Final rept. 15 Jun 79-30 Jun 80,
William F. Bernhard. 30 Aug 80, 236p NIH-N01-HV-5-3007-5
Contract N01-HV-5-3007
See also report dated Jun 78, PB-284 613.Portions of this document are not fully legible.

This report covers the fourth year of Clinical Left Ventricular Assist Device program. 19 Clinical implantations have been carried out to date, 4 during the current project year. A fifth patient developed acute aortic dissection during pump implantation and the procedure was discontinued. One of the four patients receiving an LVAD this year improved sufficiently to undergo pump removal 6 days following the implant. An acute thrombosis of a vein graft resulted in death (left ventricular failure) 10 days post pump removal. Three of 19 patients included in the program remain alive and well up to 29 months post-operatively. One of these is gainfully employed and supporting a family with 5 children. In patient No. 7, removal of the inflow conduit was carried out successfully 22 months postimplantation because of persistent sinus tract from the lower end of the midline sternotomy incision. This patient is a diabetic.

6C. Biology

AD-A089 358/6 Not available NTIS
Naval Biosciences Lab Oakland CA

Vaginal Fibromas in a Beaked Whale, Mesoplodon densirostris,
J. O. Flom, R. J. Brown, R. E. Jones, and J. Schonewald. 18 Jan 79, 4p
Availability: Pub. in Jnl. of Wildlife Diseases, v16 n1 p99-102 Jan 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A089 663/9 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Large Amplitude Patterns for Two Competing Species.
Technical summary rept.,
Robert A. Gardner. Jun 80, 36p Rept no. MRC-TSR-2090
Contracts DAAG29-80-C-0041, DAAG29-75-C-0024
Sponsor in part by grant NSF-MCS78-09525.

Large amplitude solutions are obtained for systems of semilinear reaction-diffusion equations arising in mathematical ecology which describe the evolution of two competing species. Their behavior is locally consistent with the principle of competitive exclusion. Such solutions are first obtained for a special class of steady state equations in which the two species are assumed to be exactly equal competitors; large amplitude patterns for generic classes of equations are then obtained by introducing various perturbations in the relative competitive strengths of the two species. In particular, we obtain (1), travelling wave solutions through constant perturbations, and (2), stable stationary solutions through spatially inhomogeneous perturbations. (Author)

PB81-105447
(Order as PB81-105413, PC **A10**/MF **A01**)
National Marine Fisheries Service, Honolulu, HI. Southwest Fisheries Center.
Using Markov Decision Models and Related Techniques for Purposes Other Than Simple Optimization: Analyzing the Consequences of Policy Alternatives on the Management of Salmon Runs,
Roy Mendelssohn. Sep 79, 17p NOAA-80090906-3
Included in Fishery Bulletin, v78 n1 p35-50 1980.

The mathematics of Markov decision processes and related techniques are used to analyze a model relevant to salmon management.

PB81-107401 PC **A22**/MF **A01**
Smithsonian Science Information Exchange, Inc., Washington, DC.
International Directory of Current Biosaline Research Projects.
Jul 80, 512p
Grant NSF-INT78-18652
Sponsored in part by Kuwait Inst. for Scientific Research. Food Resources Div.

Partial contents: Terrestrial saline biosystems; (Physiology and genetics of halophytes, Environmental contamination, Product Management, product Marketing and Utilization, Animals Associated with Saline Environments); Aquatic saline biosystems; (Physiology and genetics of aquatic biota, Ecology and environmental studies, Environmental contamination, Product harvesting and utilization, Mariculture).

PB81-108169 PC **E02**/MF **A01**
National Oceanic and Atmospheric Administration, Ann Arbor, MI. Great Laks Environmental Research Lab.
The Macro- and Meiobenthos of Southeastern Lake Michigan Near the Mouth of the Grand River, 1976-77.
Data rept.,
T. F. Nalepa, and M. A. Quigley. Apr 80, 19p
NOAA-DR-ERL-GLERL-17, NOAA-80090805
Includes four sheets of 24X reduction microfiche.

This report presents in detail the methods and basic results of a benthic survey designed to determine the abundance and biomass of both the macro- and meiobenthos of southeastern Lake Michigan. Sediment cores were collected at monthly intervals from May to November 1976 and 1977 by divers using SCUBA.

PB81-108185 PC **A10**/MF **A01**
North Carolina Univ. at Chapel Hill.
State and Interstate Fishery Jurisdiction: Problems and Progress. Proceedings of a Conference held at Raleigh, North Carolina on October 29-31, 1979,
Janet Caudle. Mar 80, 218p UNC-SG-80-02, NOAA-80090802
Grant NA79AA-D-00079

A Conference on State and Interstate Fishery Jurisdiction and Management was held in Raleigh, North Carolina on October 29-31, 1979. The Conference had the following objectives: (1) bring more clearly into focus the problems that are being encountered at the state and interstate levels since the establishment of the regional fishery management councils under the FCMA; (2) provide a forum for the discussion and development of management needs; and (3) set the stage for modernizing state fisheries laws.

PB81-108243 PC **A07**/MF **A01**
State Univ. System of Florida Sea Grant Program, Gainesville.
Aquatic Animal Medicine: A State of the Art; Proceedings of a Conference Held at Marineland, Florida on April 25, 1979,
Robert L. Jenkins, and Joseph G. Halusky. Mar 80, 130p FLORIDA SEA GRANT-32, NOAA-80090915

A conference jointly sponsored by the International Association for Aquatic Animal Medicine; Florida Sea Grant; and Florida Cooperative Extension Service, Marine Advisory Program was held in Marineland, Florida on April 25, 1979. The conference brought together participants to consider the state of the art of aquatic animal medicine. Viewpoints represented those of business management and economics; legal and political aspects; and manufacturing and supply of drugs. National and international overviews are also presented.

PB81-108524 PC **A02**
North Carolina Univ. at Chapel Hill.
North Carolina Sea Grant Project Exploring Eel Farming Potential,
William L. Rickards. 1980, 6p UNC-SG-R-156, NOAA-80090912
Pub. in Aquaculture Magazine, p20-24 May-Jun 80.

The University of North Carolina Sea Grant College Program has been conducting a research and demonstration project in eel culture since 1975. The UNC project's main purpose during its first three years was to assess existing eel culture methodology and determine the feasibility of culturing the American eel with these methods.

PB81-108607 PC **A02**
North Carolina Univ. at Chapel Hill.
Modeling Growth-Time and Weight-Length Relationships in a Single Year-Class Fishery with Examples for North Carolina Pink and Brown Shrimp,
Marc-David Cohen, and George S. Fishman. 1980, 13p UNC-SG-R-157, NOAA-80090913
Grant NA79AA-D-0048
Pub. in Canadian Jnl. of Fisheries and Aquatic Sciences, v37 n6 p1000-1011 1980.

This paper presents an extension of the classical concepts of growth over time and of a weight-length relationship for a single year-class fishery that explicitly accounts for the stochastic variation known to exist in such a population. Techniques for estimating the extended models efficiently are described, as are procedures for testing for differences in growth and weight-length parameters based on sex and subspecies. The potential use of these models to facilitate the quantification of population biomass is also presented. Data on North Carolina pink and brown shrimp are used to illustrate the concepts and models.

PB81-110108 PC **A04**/MF **A01**
National Marine Fisheries Service, Washington, DC.
Grant-In-Aid for Fisheries Program Activities, 1979.
Annual rept. no. 12.
Dec 79, 52p NOAA-80091507
See also report dated Oct 78, PB-292 309.

This is the 12th in a series of annual publications on program activities under the Grant-in-Aid for fisheries program of the Office of Resource Conservation and Management, National Marine Fisheries Service (NMFS). Information presented in this report provides administrators, Federal people, project personnel, and others concerned with research, development, conservation, and management of fishery resources with a convenient reference to the grant-in-aid program. This publication will also facilitate planning, coordination, and integration of State, Federal, and other activities concerned with the fishery resources.

PB81-110264 PC **A07**/MF **A01**
Virginia Inst. of Marine Sciences, Gloucester Point.
Zooplankton of the Waters Adjacent to the C. P. Crane Generating Station.
Final rept.,
George C. Grant, Cathy J. Womack, and John E. Olney. Aug 80, 147p PPSP-CPC-80-4

Zooplankton population in the Gunpowder River and its tributaries were sampled monthly from July, 1979-March, 1980 in a continuation of similar studies begun in March, 1979. The objective of the study was to determine the effect of the present once-through cooling system of the Crane Power Plant. The principal effect of the C.P. Crane generating station on zooplankton of the area is a displacement of an original freshwater community through the pumping of cooling water from Seneca Creek to Saltpeter Creek.

PB81-110785 PC **A05**/MF **A01**
Public Service Electric and Gas Co., Newark, NJ. Research and Development Dept.
Power Plant Waste Heat Utilization in Aquaculture. Volume I.
Final rept. 1 Nov 76-1 Nov 79,
C. R. Guerra, B. L. Godfriaux, A. F. Eble, A. Farmanfarmaian, and R. Pitman. Mar 80, 100p NSF/RA-800187
Grant NSF-ENV76-19854
See also Volume 2, PB81-110793. Prepared in cooperation with Trenton State Coll., NJ., Rutgers - The State Univ., New Brunswick, NJ., and Long Island Oyster Farms, Inc., Northport, NY.
Also available in set of 3 reports PC E17, PB81-110777.

A three-year research study on the constructive use of electric generating station waste heat in cooling water effluents for fish production is summarized. Results of the project indicate not only that it is biologically feasible to rear fresh water shrimp and rainbow trout alternately during warmer and cooler months directly in these effluents, but that it appears to be economically and technically feasible. A prototype commercial waste heat aquaculture facility for the high density culture of both finfish and shellfish is described in a subsequent proof-of-concept study. This volume presents the research objectives, approach, and product use and a technical section outlining the engineering, biological, and economic feasibility as well as product quality.

PB81-110793 PC **A14**/MF **A01**
Public Service Electric and Gas Co., Newark, NJ. Research and Development Dept.
Power Plant Waste Heat Utilization in Aquaculture. Volume II.
Final rept. 1 Nov 76-1 Nov 79,
A. F. Eble. Mar 80, 314p NSF/RA-800188
Grant NSF-ENV76-19854
See also Volume 1, PB81-110785, and Volume 3, PB81-110801. Prepared by Trenton State Coll., NJ. Dept. of Biology.
Also available in set of 3 reports PC E17, PB81-110777.

A three-year research study on the constructive use of electric generating station waste heat in cooling effluents for fish production is presented. This volume specifically describes that part of the research conducted by Trenton State College. Water temperatures from the discharge canal of the Mercer Generating Station in New Jersey were blended with those from the Delaware River by pumps installed in strategic locations to achieve desired temperatures. The report further describes how recirculation is controlled during chlorination periods by activating and de-activating certain pumps. As a result of this procedure, plus an

oxygen injection system, trout density was greatly increased. Techniques for growing and maintaining shrimp larvae and early juveniles in nursery systems are described. Harvest densities of the shellfish did not compare with those obtained for finfish.

PB81-110801 PC **A07**/MF **A01**
Public Service Electric and Gas Co., Newark, NJ. Research and Development Dept.
Power Plant Waste Heat Utilization in Aquaculture. Volume III.
Final rept. 1 Nov 76-1 Nov 79,
A. Farmanfarmaian. Mar 80, 133p NSF/RA-800189
Grant NSF-ENV76-19854
See also Volume 2, PB81-110793. Prepared by Rutgers - The State Univ., New Brunswick, NJ.
Also available in set of 3 reports PC E17, PB81-110777.

This report is part of a three year research study on the constructive use of electric generating station waste heat in cooling water effluents for fish production. It describes procedures and methods for the commercial culture of the giant fresh water shrimp, Macrobrachium rosenbergii, and the rainbow trout, Salmo gairdneri, in the thermal discharge water of the Mercer Power Plant in Trenton, New Jersey. Discharge water from this plant was used in a preliminary assessment of the survival, growth, and food conversion ratio of these species. It was shown that acute or chronic exposure to power plant intake and discharge water; discharge with or without coal particles; and discharge with or without slurry overflow mix does not significantly affect metabolism, short-term survival, growth, or conversion efficiency of shrimp or trout.

PB81-110876 PC **A04**/MF **A01**
Georgia Dept. of Natural Resources, Atlanta. Coastal Resources Div.
Georgia Shad Catch-Effort Study (1979).
Completion rept. 1 Oct 78-30 Sep 79,
Michael A. Hardisky, and Kathy H. Smith. Aug 80, 75p NOAA-80090201

On October 1, 1978, the Georgia Department of Natural Resources began a 12-month investigation of Georgia's commercial and recreational shad fishery. Because of the alarming decline in shad landings during recent years, and man's continued fishing efforts and improvements in fishing gear and techniques, this information was vital for managers to make current and timely management decisions and update laws and regulations. This study evaluated the accuracy of existing collection techniques for commercial shad landings in Georgia.

PB81-111288 PC **A03**/MF **A01**
Auburn Univ., AL.
Liquid Ammonium Polyphosphate as a Fish Pond Fertilizer,
Randy Joe Metzger. 1980, 33p W81-00009, OWRT-B-076-ALA(5)
Contract DI-14-34-0001-9101

Sunfish ponds were fertilized 11 times during the growing season with liquid ammonium polyphosphate (13-38-0) at 5.6, 11.2, or 22.4 kg/hectare application. Net production of sunfish averaged 310, 315, and 418 kg/hectare in the low, medium, and high treatments, respectively.

PB81-111296 PC **A03**/MF **A01**
Auburn Univ., AL.
Nighttime Aeration to Increase Production of Channel Catfish,
William David Hollerman. 18 Mar 80, 36p W81-00008, OWRT-B-076-ALA(4)
Contract DI-14-34-0001-8001

Channel Catfish (Ictalurus punctatus) were stocked in 0.02- to 0.04-hectare ponds at 20,385 per hectare and fed daily. Fish averaged 11 cm total length and 6.2 g at stocking. Six ponds received daily nighttime aeration (2 to 6 hours) and six ponds received no aeration. A maximum feeding rate of 90 kg/hectare was reached by midsummer. In the aerated treatment, no dissolved oxygen (DO) problems occurred, and survival was 92%. Fish mortalities resulted from DO depletion in all ponds of the un-aerated treatment, and survival was 40%. Nitrite-nitrogen concentrations were significantly higher in the aerated treatment. Concentrations of un-ionized ammonia in both treatments were high enough to have adversely affected growth.

PB81-111569 PC **A02**/MF **A01**
California Univ., Santa Cruz.
Preliminary Investigations of the Possible Relationship between Passive Behavior by Spotted Dolphins, 'Stenella attenuata' and Capture Stress.
Final rept.,
Warren E. Stuntz. Oct 80, 20p MMC-77/25
Contract MM7AC027

Some porpoises caught in yellowfin tuna purse seine nets passively lie on the bottom of nets and move awkwardly. Individuals demonstrating such behavior may increase their probability of being killed. If passive behavior is associated with capture stress as seen in terrestrial mammals, the actual mortality of porpoises from tuna seining may differ from that presently estimated. This preliminary study was made to determine the relationship between passive behavior and capture stress in spotted dolphins, Stenella attenuata, captured in purse seines during the process of fishing for yellowfin tuna, Thunnus albacares. Due to poor fishing conditions during the trip and the resulting small number of sets on porpoises, very few data were collected. Blood samples were taken from 15 spotted dolphins. The serum was analyzed for enzyme levels. No conclusions could be drawn relative to capture stress and porpoises in the purse-seining fishery.

6E. Clinical Medicine

AD-A089 172/1 PC **A03**/MF **A01**
Cincinnati Univ OH Coll of Medicine
Host Defense against Opportunist Microorganisms Following Trauma.
Annual summary rept. 1 Jul 78-30 Jun 79,
Ann B. Bjornson, William A. Altemeier, and H. Stephen Bjornson. Jun 79, 49p
Contract DAMD17-76-C-6023

Studies were performed to evaluate selected humoral components of host defense in 4 septic and 6 non-septic burned patients during 60 days postburn. The parameters measured in all patients were total hemolytic complement (CH50), C3 conversion by inulin and cobra venom factor CoVF), and immunochemical concentrations fo Clq, C4, C2, C3, C5, factor B, properdin, and C3b inactivator (C3bINA). Ch50 and Clq were decreased in the sera of the septic burned patients during the first 10 days postburn, but were restored to normal thereafter. CH50 and Clq were normal or elevated in the sera of the non-septic burned patients for the duration of the study. Concentrations of C4, C2, C3 and C5 in the sera of all the patients were normal or elevated for the entire study period. C3 conversion by inulin and CoVF and the concentration of properdin were reduced in the sera of the septic and non-septic burned patients for the duration of the study, and concentrations of factor B and C3bINA were normal or elevated. When the non-septic burned patients were subdivided by the presence or absence of transient bacteremia, no significant difference in concentrations or functional activity of components of the classical or alternative complement pathways was demonstrated.

AD-A089 218/2 PC **A02**/MF **A01**
Hebrew Univ Rehoveth (Israel) Faculty of Agriculture
Target Oriented Drugs against Leishmania.
Annual summary rept. no. 1, 1 May 79-1 Feb 80,
Uri Zehavi, and Joseph El-On. 31 Jan 80, 19p
Grant DAMD17-79-G-9452

Excreted Factor (EF) is a carbohydrate-rich protein excreted by different strains of Leishmania. It has antigenic properties similar to those of the parasite and plays a role in the infective process. Isolation and purification of EF is necessary for: study of its biological function; the use of EF for diagnostic purposes; the use of EF in immunization experiments; the study of the biosynthesis of EF; and the preparation of inhibitors of particular biosynthetic steps of EF. Chemical analysis of partially purified EF was carried out. This indicated a high galactose content of EF. Independent reactions of EF with beta-galactosidase and with peanut lectin (PNA) suggest the presence of beta-galactosyl units at the non-reducing end of at least part of the carbohydrate component of EF. Interaction of promastigotes with PNA, reversed by galactose, indicates the presence of the same galactose component in cell membrane constituents of promastigotes. Purification of EF was achieved using chemical procedures including a phenol extraction method, followed by affinity chromatography. Initial experiments aimed at constructing a radioimmunoassay (RIA) for Leishmania were undertaken. Galactose residues in EF and galactose attached to the promastigote cell membranes may play an important role in the mechanism of infection by Leishmania. (Author)

AD-A089 242/2 PC **A99**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Experience of Soviet Medicine in a Great Patriotic War 1941-1945,
D. G. Gol'dberg, I. Ya. Razdol'skiy, Ye. A. Uspenskiy, I. R. Razdol'skiy, and D. G. Gol'dver. 27 Aug 80, 1187p Rept no. FTD-ID(RS)T-0791-80
Unedited machine trans. of Opyt Sovetskoy Meditsiny v Velikoy Otechestvennoy Voine, 1941-1945 (USSR) v11 p1-416 1952.

No abstract available.

AD-A089 256/2 PC **A06**/MF **A01**
Continental Army Command Fort Monroe VA
Drug Abuse & Alcoholism Control Program.
Sep 71, 108p

The Commanding General has directed a triaxial program of education, rehabilitation, and law enforcement to counter drug and alcohol abuse problems within CONARC. Central to success of this program is provision of credible troop information and conduct of intensified education programs emphasizing the physiological and psychological dangers and the moral and legal implications of both alcoholism and drug abuse. Full details of the Army's exemption and rehabilitation programs will receive the widest dissemination to assist the potential volunteer in seeking help. Concurrently, positive steps will be taken to identify alcohol and drug abusers at the earliest possible moment and insure that competent medical attention is available and accessible. The recent DOD drug use testing program in Southeast Asia has helped identify returnees who require continued medical supervision. A complete program of follow-up rehabilitative services is necessary for these personnel.

AD-A089 352/9 PC **A03**/MF **A01**
Cincinnati Univ OH Dept of Environmental Health
A New Procedure for Preparing Uniform Fecal Samples for LSC. Revision.
Interim rept. no. 4, 11 Mar-14 May 80,
Carl C. Smith, Steele F. Mattingly, Geraldine F. Wolfe, David H. Bauman, and Gary L. Keller. 29 Aug 80, 37p
Contract DAMD17-79-C-9106
Revision of report dated 11 Jun 80.

A procedure was developed for preparing uniform fecal samples for LSC counting and study of fecal metabolites. The procedure requires milling of a rat or monkey feces sample with anhydrous Na2SO4 in a stainless steel ball mill. The fine off-white flours that result are passed through a fine wire sieve (18-8 stainless steel wire, 30 holes/inch). This sieving increases homogeneity by removing traces of unground material and dietary fiber. Digestion of samples with NaOH and counting total 14C in dioxane-toluene-naphthalene with Cab-O-Sil (DTN-C) gave reproducible recoveries. This procedure was adequate for 0.25 g and 0.5 g samples but inadequate for 1.0 g samples. In a study of 7 solvent/digestants (1) Soluene, (2) NaOH and (3) Protosol extracted the most dpm (14C) from feces samples and showed the best reproducibility. Protosol and Soluene digests counted as efficiently in Biofluor as in DTN-C. Ten replicate Soluene digests in Biofluor and 10 replicate NaOH digests in DTN-C showed mean % recoveries which matched well (NaOH, 40.6 + or - 1.0 SD; Soluene, 41.3 + or - 1.35 SD). Combustion assays for total

14C gave recoveries that agreed well with values obtained by digestion in NaOH, Soluene, and perchloric acid - H2O2. One gram aliquots of 4 milled feces samples were extracted sequentially 3 times with THF and extracted once with Soluene.

AD-A089 371/9 PC **A03**/MF **A01**
Army Medical Intelligence and Information Agency Fort Detrick MD
Disease Threat at High Terrestrial Altitudes. Volume 1.
Final departmental study.
Aug 79, 37p Rept no. USAMIIA-1-79-VOL-1

This study investigates the risk of diseases to unacclimatized personnel rapidly translocated to, or stationed in, terrestrial areas at altitudes above 3,000 meters. Both short and long term impacts (if any) such diseases would have on military operations at these elevations are addressed. (Author)

AD-A089 428/7 PC **A02**/MF **A01**
Federal Aviation Administration Washington DC Office of Aviation Medicine
Postmortem Coronary Atherosclerosis Findings in General Aviation Accident Pilot Fatalities: 1975-1977,
C. F. Booze, Jr., J. K. Pidkowicz, A. W. Davis, and F. A. Bolding. Feb 80, 13p Rept no. FAA-AM-80-8

The autopsies of 764 pilots involved in fatal general aviation accidents during the years 1975-1977 were reviewed to appraise the age specific prevalence of coronary atherosclerosis among the autopsied group. Fifty-one percent of the pilots killed in aircraft accidents and autopsied during 1975-77 were found to have some degree of coronary atherosclerosis ranging from minimal to severe. However, only about 5 percent of the autopsied group were categorized as having severe coronary atherosclerosis. The rate per 1,000 of severe coronary atherosclerosis increased with age from 14.5 for ages less than 30 to 89.9 for ages 50 years and above, with the rate nearly tripling from ages 30-39 to 40-49 (22.1 to 63.6). While the findings of this study are consistent with, and do parallel, the findings of other recent autopsy studies, the prevalence of coronary atherosclerosis among this group of autopsied airmen is less than would have been expected based on the results of these other studies. (Author)

FRNC-TH-718 PC **A04**/MF **A01**
Brest Univ. (France).
Contribution of Scintigraphy in the Search for Bone Metastases.
Andre Miossec. 1976, 58p
In French.Thesis.
U.S. Sales Only.

The inclusion of scintigraphy in the repertory of diagnostic techniques is quite recent, but this examination is continually gaining in importance. In the case of bone metastases it certainly contributes to early diagnosis, a factor which is still the foremost condition of therapeutic efficiency. However some faults persist in the detection of metastases and it is hoped that the isotopic technique will gradually eliminate these errors. Scintigraphy in fact is still in its infancy, and several products are used for want of a consensus. Many improvements are expected in the future, whether in the technique itself or in its reliability or interpretation. - Technical improvement with the appearance of more sensitive instruments, tomography... - Improved interpretation by the acquisition of images on which hypofixation and hyperfixation zones will be more clearly differentiated and by a more accurate, more mathematical estimation of hypofixation and hyperfixation. Progress is already very rapid in this respect owing to the arrival of computerization. - Better reliability, perhaps the field in which hopes are highest: discovery of new radioactive products acting selectively in the metabolism or catabolism of the neoplasic process. Scintigraphy is a technique undoubtedly destined for considerable further development and called on to play an increasingly important part in cancer diagnosis and even in research on the cancer call development process itself. (Atomindex citation 11:517727)

FRNC-TH-719 PC **A06**/MF **A01**
Nantes Univ. (France).
Contribution of Sup(99M)Tc Labelled Sodium Pyrophosphate Bone Scintigraphy to the Diagnosis of Bone Metastases.
J. P. Remi. 1976, 117p
In French.Thesis.
U.S. Sales Only.

Bone scintigraphy, by its ease of application and the use of short-lived isotopes, has revolutionised the conditions of bone metastase diagnosis. Scintigraphy possesses two advantages, the possibility it offers of exploring the whole skeleton at once and its extreme simplicity. This technique should therefore find its place at the very beginning of the bone examination, an attitude which also has dosimetric repercussions: a 'whole skeleton' examination delivers 170 mrad to the marrow, whereas spinal and pelvic X-rays deliver 325 mrad. Unfortunately the sup(99m)Tc-labelled sodium pyrophosphate bone scintigraphy is not specific to any given lesion. Diagnosis can only be improved by the appearance of tracers taken up specifically on the neoplasic tissue, as is already the case of exp 131 I for thyroid cancer metastases. Labelled bleomycine and exp 67 Ga have so far given disappointing results. (Atomindex citation 11:517735)

HRP-0016862/5 PC **A06**/MF **A01**
Young (Arthur) and Co., Washington, DC.
Methods for Determining and Projecting Needs and Demands for Acute Inpatient Care Services.
1975, 120p
Contract PHS-HRA-106-74-36
See also HRP-0023515.

Six methods for determining and projecting needs and demands for acute inpatient care services are reviewed in this monograph. The six methods are: (1) the clinical appraisal of existing utilization method; (2) the combined regression and bed survey method; (3) the family of bed needs formula projection methods; (4) a probabilistic technique for estimating expected inpatient utilization by service; (5) the computer simulation method; and (6) an information system method for characterizing a health care system. Each method is assessed against four criteria: (1) how the method identifies a population having needs and demands for acute inpatient care services; (2) how the method indicates the circumstances that produce inpatient care utilization, and measures the prevalence of such circumstances in a population; (3) how the method predicts how much acute inpatient care utilization (admissions and total patient-days) will occur within this population; and (4) how the method specifies the number of acute inpatient care beds which are required to handle the utilization that will occur. Twenty-five tables and 12 figures help present the assessment for each method.

HRP-0028707/8 PC **A04**/MF **A01**
Duke Univ., Durham, NC.
Impact of Legal Restrictions on the Future Role of Dental Auxiliaries,
Joseph Lipscomb. 1978, 64p

Writing in 1974 about recent changes in state regulations governing delegation of tasks to dental auxiliaries, McBride (57) concluded: 'Despite their broad rulemaking authority, the majority of dental boards have not permitted substantially more responsibility to auxiliaries than was allowed under the older, 'special-(permissible task) listing' statutes. As a result, a wide range of expanded functions, which can be safely and efficiently performed by properly trained auxiliaries, remains legally off-limits to these paraprofessionals'. The purpose of this paper is to show the development and implementation of methodologies which allow one to examine McBride's contention operationally.

HRP-0029231/8 PC **A08**/MF **A01**
Young (Arthur) and Co., Washington, DC.
Study of the Impact of Health Care System Components Interaction. Volume 1. Final Report on Project Activities.
1 Jun 76, 172p
Contract PHS-HRA-230-75-0070
Prepared in cooperation with Technical Assistance Research Program, Inc., Washington, DC. See also Volume 2, HRP-0029232.

The goal of this applied research and development project was the derivation of methodologies and tools for health planners to utilize in identifying and assessing alternatives for health services delivery. Four specific project objectives were delineated: classification of health services delivery components and identification of alternatives within each classification, assessment of the impact of alternative health service delivery components on other components and the health system as a whole, development of an impact assessment methodology and sample tools designed for use by health planners, and preparation of training materials to employ in teaching planners regarding the implementation of the impact assessment methodology. To identify various health service delivery components, a taxonomy of health care was prepared that categorizes the health care delivery system by type of service. Criteria were formulated and sites were selected for testing and refinement of the impact assessment methodology. Impact assessment is believed to be similar to financial feasibility analysis and, as such, impact assessment can be undertaken using existing techniques as guidelines. Factors within the health system that influence the impact and interaction of change are population characteristics, service areas, patient movement, physician location, travel time and access, and economics. References are cited.

HRP-0029232/6 PC **A08**/MF **A01**
Young (Arthur) and Co., Washington, DC.
Study of the Impact of Health Care System Components Interaction. Volume 2: Impact Assessment Methodology; a Framework for Health System Planning.
Final rept.
1 Jun 76, 155p
Contract PHS-HRA-230-75-0070
Prepared in cooperation with Technical Assistance Research Program, Inc., Washington, DC. See also Volume 3, HRP-0029233.Portions of this document are not fully legible.

The Impact Assessment Methodology provides for its user a framework for determining, structuring and analyzing those factors which he (she) considers most critical to his planning situation. In so doing, the methodology makes use of techniques and concepts whose utility have been proven in the area of corporate planning and/or other aspects of social planning. It is not the purpose of this document, however, to provide the reader with thorough explanations of these tools--particularly the variety of uses and underlying concepts behind the decision tree technique.

HRP-0029233/4 PC **A02**/MF **A01**
Young (Arthur) and Co., Washington, DC.
Study of the Impact of Health Care System Components Interaction. Volume 3: Project Administration.
Final rept.
1 Jun 76, 20p
Contract PHS-HRA-230-75-0700
Prepared in cooperation with Technical Assistance Research Program, Inc., Washington, DC. See also Volume 2, HRP-0029232.

Methodology and project management aspects of an on-site study of the impact of health delivery changes at seven diverse locations are described in this paper. The sites and changes analyzed ranged from rural Fayetteville, Arkansas's creation of a long-term care facility to urban Santa Barbara, California's institution of a hemodialysis unit. Data were collected and analyzed on utilization, charges, cost, and resources. The project objective was to study these four elements in terms of the impacts and interactions of discrete changes, and to facilitate codifying and analyzing the data to arrive at useful generalizations. Site visits focused on agency selection among various service alternatives and identification of differences between rural and urban interaction effects. A questionnaire checklist was developed to aid health planners in identifying and assessing which alternative service option should be chosen. Two companies were contracted to perform the project; their specific roles are described here. Almost twice as many professional hours were expended to complete the project than were expected. Graphs illustrate the project's schedules at different sites.

HRP-0029527/9 PC **A04**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH.
A Nationwide Survey of the Occupational Safety and Health Work Force.
Jul 78, 69p DHEW/PUB/NIOSH-78-164

This study was funded by the National Institute for Occupational Safety and Health (NIOSH) in response to diverse estimates of potential manpower shortages in the occupational safety and health field. NIOSH, charged with the responsibility of assuring a sufficient occupational safety and health labor force to implement the Occupational Safety and Health Act of 1970, undertook a feasibility study in 1974 to determine whether a nationwide survey could accurately describe the existing occupational safety and health work force and to develop a manpower forecasting model capable of estimating future occupational safety and health work force requirements. The goal of the study reported here was to provide NIOSH, other federal agencies, educational institutions, private industry, and individuals interested in entering the occupational safety and health field with an assessment of the demand for additional trained employees.

HRP-0029616/0 PC **A21**/MF **A01**
Hillhaven Foundation, Tacoma, WA.
Nationwide Long Term Care Education Center for Region IV.
Final rept. 26 Jun 75-15 Jul 77.
15 Jul 77, 489p
Sponsored in part by Health Resources Administration, Hyattsville, MD.Portions of this document are not fully legible.

The history of the development of the Nationwide Long-Term Care Education Center is provided, and the design and delivery of two different 40 hour courses are discussed. The major goals of the courses are enumerated. The number and characteristics of course participants are noted. The problems encountered are considered, including the most pressing problem--lack of time. One aspect of the time problem was the scheduling of courses. Since the courses were held every other week, the staff did not have sufficient time to adjust or design new teaching methods, techniques, and modules, or to participate in other professional growth activities. Recommendations are included for future programming. The impact of the project on patient care is noted. One of the greatest areas of the program's impact was the awareness created of the scope and necessity for staff development programs. A brochure on the Hillhaven Foundation is provided. The Center's implementation plan is included as are its organizational charts. The philosophy of the Center is outlined. Summaries of all 40 hour courses are provided as are first and second year participant questionnaires and surveys.

HRP-0029712/7 PC **A04**/MF **A01**
Institute of Medicine, Washington, DC. Div. of Health Sciences Policy.
DHEW's Research Planning Principles: A Review.
Mar 79, 69p DHEW/PUB/NIH-79-1955
Contract N01-OD-8-2143

The Committee strongly endorses the introduction of long-range planning for health research as initiated by the Secretary of DHEW. The committee believes that health research planning, when well performed, will prove to be a valuable mechanism for developing sound and productive national health research policy. Well conceived and executed planning is the nation's best assurance that there will be optimal allocation of resources for health research, and that precious resources will be utilized efficiently. The plan and the policies growing from it should take into account the past productivity and future promise of the health sciences; the essential need for research across the full range of the health sciences to permit further advances in the diagnosis, treatment, and prevention of disease; the heavy burdens imposed on society by illness; and strong support of the public for health sciences research.

HRP-0029714/3 PC **A16**/MF **A01**
National Institutes of Health, Bethesda, MD.
DHEW Health Research Principles. Volume I. Documents Relating to the Development of Draft Health Research Principles for the Department of Health, Education, and Welfare, April-December 1978. Appendices A and B.
1979, 370p DHEW/PUB/NIH-79-1891
See also Volume 1, Appendix C, HRP-0029715.

Health research principles are the focus of these appendixes to a DHEW report. Approximately 1,000 professional societies and health organizations were requested to submit their views and suggestions on health research principles for DHEW and were later invited to participate in a national conference on health research in 1978. These societies and organizations are listed in Appendix A. The public's comments were also sought, and are included in Appendix B; the DHEW Secretary's remarks to the annual meeting of the American Federation for Clinical Research provided the context. General themes noted in the comments were incorporated in materials sent to all individuals who registered for the national conference. Topics of interest concerned such health issues as: abortion, nursing, physical medicine and rehabilitation, physicians' assistants, osteopathic medicine, dental schools, cardiology, dental services, obstetricians and gynecologists, blind persons, public policy research, clinical research, psychiatry and psychology, anesthesia in dentistry, clinical hypnosis, hematology, urology, children with learning disabilities, epidemiology, chiropractic, mental illness, dermatology, and sex information and education. A list of attachments received with letters containing public comments is provided.

HRP-0029715/0 PC **A99**/MF **A01**
National Institutes of Health, Bethesda, MD.
DHEW Health Research Principles. Volume I. Documents Relating to the Development of Draft Health Research Principles for the Department of Health, Education, and Welfare, April-December 1978. Appendix C.
1979, 734p DHEW/PUB/NIH-79-1892
See also Volume 1, Appendices A and B, HRP-0029714.

This appendix contains copies of all public testimony considered in the development of the final report of the National Conference on Health Research Principles. The testimony is grouped into the five areas considered by the panels in developing the principles: fundamental research, clinical applications and health services research, health regulation and promotion, research capability, and unifying concepts. An additional section is provided for general public testimony. All testimony received by December 1, 1978, is included in this book, but only that received by September 29 was considered by the different panels. Three categories of testimony are included within each panel area: written testimony received before the conference; oral testimony delivered at the conference; and written testimony received after the conference. All the testimony was prepared by professional societies and health organizations who were contacted and invited to participate in the conference. Also included is a list of attachments received with the public testimony.

HRP-0030400/6 PC **A04**/MF **A01**
PACT Health Planning Center, Denver, CO.
Raising Funds to Develop Community Health Services: A Technical Assistance Memo.
Ila Bishop, and Paul Millette. 7 Mar 79, 58p

Guidelines for use by Health Systems Agencies (HSA) in helping communities or organizations obtain funding for the development of community health services are presented. Some of the methods suggested include direct mail solicitation, benefits, personal contributions, and grants. Grants require research, program planning, and proposal writing. Program planning involves an assessment of primary community health needs and an accurate translation of these needs into a concise, but complete, summary. Proposal writing requires careful consideration of a community's needs, a well-stated rationale for requesting funding, and a thorough understanding of application procedures. A proposal should state the problem clearly and provide a concise outline of objectives, methods, reporting mechanisms, evaluation procedures, future funding resources, and a budget. An appendix supplies organizational supporting information. The guidelines conclude with specific methods for effective fundraising, a systematic approach to preparing for grant applications, a list of principles for writing proposals, a proposal review sheet outling essential aspects of proposal preparation, and a sample of available grants and the foundations that award funds for community projects.

HRP-0031209/0 PC **A08**/MF **A01**
Beth Israel Hospital and Geriatric Center, Denver, CO.
A Program to Plan, Coordinate and Implement Training Opportunities for Long-Term Care Provider Personnel in Colorado: The Comprehensive Report.
Rept. for 1 Oct 77-30 Sep 78,
LeRoy King. Sep 78, 168p
Contract PHS-HRA-230-77-0118
See also HRP-0901876.

A program to improve the quality of health care in long term facilities throughout Colorado by instituting training programs for staff personnel is described. A Denver hospital functioned as an educational center for the 5-year program. To coordinate information and educational services, an advisory committee was formed. A questionnaire was used to identify training needs within various facilities. Thirty-two percent of the 204 questionnaires distributed were returned. Data were used to evaluate facilities and available resource persons. Basic programs were then sponsored to provide training and information related to long-term health care provision. Tabular data showing the breakdown of participants attending training programs according to their provider position are presented. Extended appendixes provide management plans, the survey questionnaire, personal resource resume form, State organizational resource inventory, evaluation plan and forms, a summary of services, progress reports, special advisory committee minutes, course outlines, sample program publicity, curriculums used for certain programs, and an analysis summary of the individual workshop.

HRP-0900052/2 PC **A08**/MF **A01**
Health Resources Administration, Hyattsville, MD.
The Health System Economic Profile. Users' Guide.
30 Apr 77, 165p
Sponsored in part by Bureau of Health Planning and Resources Development, Hyattsville, MD. See also HRP-0900053.

The HSEP users' guide is one of three documents produced in a project to develop and test an approach to a methodology for the economic description and analysis of areawide health care systems. The Health System Economic Profile (HSEP) is a set of seven reports displaying financial, statistical, and demographic data. The HSEP is designed to be used to describe and analyze an areawide health delivery system in economic and financial terms. It is intended primarily for use by health systems agencies in conducting a variety of analytical activities associated with several agency functions, notably, plan development and project review.

HRP-0900434/2 PC **A14**/MF **A01**
Institute for the Study of Humanistic Medicine, San Francisco, CA.
Prototype Center in Humanistic Medicine, Part II.
Final rept.
26 May 78, 303p
See also report dated 26 May 78, HRP-0900428.

The appendixes to the final report of a project for the development of a prototype center for humanistic medicine are presented. The Health Resources Administration funded the Institute for the Study of Humanistic Medicine, San Francisco, Calif., to carry out eight objectives related to research, training, education, and information distribution. Presented in the appendixes are: a selected bibliography on the field of humanistic medicine, an annotated bibliography on superhealth, an annotated bibliography on the role of the will in health, a feasibility study on optimal health, a list of functions of the Institute for the Study of Humanistic Medicine, an end of the year report on Objective

I - the development of research in humanistic medicine, a feasibility study on optimal health, criteria for operational planning activities for a multispecialty model training center, potential program information for prototype external training programs in humanistic medicine, articles considered for dissemination to educators and planners, articles on humanistic medicine appearing in the New Physician, and a plan for future project funding.

HRP-0900640/4 PC **A06**/MF **A01**
Southern Regional Education Board, Atlanta, GA.
Abstracts of Nursing Research in the South. Volume 2,
Audrey F. Spector, Barbara Lovett Mauger, and Kenneth Huggins. 1980, 125p
Grant PHS-NU-00543
See also Volume 1, HRP-0900641.

The volume includes only (a) independent research, doctoral dissertations, and master's thesis; (b) research done in the SREB region; and (c) research done after 1976. However, some abstracts were received of research which was done before 1977, outside the region, or for a baccalaureat degree. The titles and identifying information for these studies are included in this volume, but the abstracts have been reproduced in a supplement which can be obtained by writing to the Nursing Research Development in the South project, Southern Regional Education Board, 130 Sixth Street, N.W., Atlanta, Georgia 30313. Regarding the editorial policies for the publication the authors have tried to maintain as much consistency as possible in style and type of information included. Most abstracts include (a) a statement of problem or need; (b) a statement of purpose; (c) a description of samples, data collection tools, and statistical analyses; (d) a summary of findings and conclusions; and (e) recommendations for future research. There has been no attempt to screen abstracts for adequacy of research design, sample selection, or data analysis. Researchers reading these abstracts will make their own judgments about the quality of each study, its contribution to nursing, and its value as a basis for further investigations.

HRP-0900641/2 PC **A07**/MF **A01**
Southern Regional Education Board, Atlanta, GA.
Abstracts of Nursing Research in the South. Volume I,
Audrey F. Spector, Barbara Lovett Mauger, and Kenneth Huggins. 1979, 137p
Grant PHS-NU-00543
See also Volume 2, HRP-0900640.

Ever since the first planning conference of the Southern Regional Education Board's (SREB) Council on Collegiate Education for Nursing in 1962, it has been a major concern of the Council to increase and strengthen research in nursing services and nursing education. This volume of abstracts, compiled by SREB's Nursing Research Development Project, is a product of that concern. Nursing must increase its knowledge base to insure its continued development. A major barrier to this development has been the limited availability of publication opportunities for nurse researchers. Although nursing research publications have increased in recent years, the means of communicating findings are still inadequate for the research now being conducted. Therefore, it is a purpose of this volume to disseminate information about work that has and is being done, so that researchers do not duplicate past studies unknowingly, and that the largest number of nurses may have access to the latest research developments. It is hoped that the studies abstracted here will provide a convenient overview of the present status of nursing research in the South and will help to stimulate interest in new directions for nursing, as well as new perspectives on those areas previously investigated.

HRP-0901343/4 PC **A07**/MF **A01**
Chi/SMP, Ann Arbor, MI.
Institutional Planning Procedures Manual. Health Facility Planning and Development. The Generic Planning Process.
Jun 78, 139p
Contract PHS-HRA-230-75-0175
See also HRP-0901342. Prepared in cooperation with Stone, Marraccini, Patterson, San Francisco, CA.

Process and methodological aspects of health planning that are important in decisions about health resources, including health facilities, are investigated. The project to study health facility planning and development was initiated in 1975 and is designed to develop a generic health facility planning process, a health program planning process, a health facility functional and space programming process, health facility design options, performance specifications for construction, and facility and service postevaluation procedures. Concepts applicable to institutional planning include need and demand, efficiency, quality, clinical departments and programs, matching (consideration of health care in terms of clinical programs and services and their measurement in service equivalents), and implementation, including politics. The manual of process and methodological aspects of health planning at the institutional level focuses on a policy and planning framework, service area characteristics, health service needs, health services and resources, plan development, and review (certificate of need, review of Federal funding, and appropriateness review). Appendixes contain a detailed chart of the generic planning process, questionnaires used to survey health facilities, information on techniques used to obtain consumers' opinions about the planning process, and reference sources.

HRP-0901400/2 PC **A07**/MF **A01**
American Association for Respiratory Therapy, Dallas, TX.
Development of Evaluative Simulations. Subproject IV.
Jul 78, 141p
Contract PHS-HRA-231-75-0213
Portions of this document are not fully legible.

A project was initiated by the American Association of Respiratory Therapy to develop a series of written evaluative simulations for use by the National Board for Respiratory Therapy in certifying registered respiratory therapists. Project activities were comprised of four stages: (1) development of criteria for the selection of simulation topics: (2) development of draft simulations, including final topic selection and the designation of behavioral objectives, preliminary scoring, and final review; (3) review of simulations and accompanying materials by the Clinical Simulation Examination Committee of the National Board for Respiratory Therapy; and (4) pilot testing with a group of 20 respiratory therapy practitioners having varied backgrounds in experience, education, and credentialing. Scoring of simulations was performed through the assignment of weights involving effective patient care on a scale from critical to effective patient care to critically harmful to patient care. Important dimensions of simulation were presenting conditions, etiologies, patient age, time (acute-chronic), procedures (diagnostic-therapeutic), setting (emergency room, recovery room, acute care facility), availability of supportive resources, application of knowledge, and mental processes. Nine clinical problems were reviewed: chronic obstructive lung diseases (conservative treatment), chronic obstructive lung disease (ventilator treatment), post-traumatic treatment, postoperative respiratory failure, assessment of pulmonary function, cardiopulmonary resuscitation, oxygen transport, pediatric care, and neonatal care. Additional information and forms pertinent to the simulations is appended, and policies and procedures governing the use of the simulating are described.

HRP-0901402/8 PC **A08**/MF **A01**
American Association for Respiratory Therapy, Dallas, TX.
National Conferences on Credentialing in Respiratory Therapy. Subproject VI.
1978, 158p
Contract PHS-HRA-231-75-0213
Portions of this document are not fully legible.

Two national conferences were held by the American Association for Respiratory Therapy (AART), one in 1976 and one in 1978, to establish a foundation for the development of a competency assurance system for respiratory therapy personnel. The 1976 conference focused on criterion-referenced measurement (skills assessment in testing and measurment and developments in criterion-referenced measurement), the definition of competency assurance (fundamental principles underlying the concept of competency assurance in the health professions, involvement of the AART in defining respiratory therapy personnel competency, and roles and functions of respiratory therapy personnel), the measurement of competence (application of criterion-referenced measurement theory to certifying examination development and presentation of a domain-referenced test specification for respiratory therapy), the resolution of competence deficiencies (prescriptive learning system keyed to criterion-referenced certifying examinations and the potential for integrating such a system with an external degree program in respiratory therapy), and a general competency assurance model. The 1978 conferees considered competency assurance from the standpoint of five phases: arriving at a verified position classification, judging the viability of the position classification, weighing competency statements, formulating the role delineation, and implementing the single entry-generalist classification. Preconference information and the conference proceedings are contained in appendixes.

HRP-0901876/3 PC **A02**/MF **A01**
Beth Israel Hospital and Geriatric Center, Denver, CO.
A Program to Plan, Coordinate and Implement Training Opportunities for Long-Term Care Provider Personnel in Colorado: Executive Summary of the Final Report.
Rept. for 1 Oct 77-30 Sep 78,
LeRoy King. Sep 78, 12p
Contract PHS-HRA-230-77-0118
See also HRP-0031209.

For 4 years, a regional education center affiliated with a Denver hospital provided continuing education and staff training for personnel in long-term care facilities. To form a coordinated network of information and educational services, a statewide advisory committee was established. Selected resource personnel qualified to teach in particular areas of health care for the aging were then identified. Organizations providing continuing education on long-term care were listed. Training program sites were located based on their proximity to care facilities. Eight basic programs were sponsored, including one devoted to improving mental health and another focusing on interdisciplinary patient planning and patient care. Long-term care facilities were thus informed of particular needs for educational training. It was concluded that the advisory committee provided leadership for the basic training program. However, a followup evaluation is needed to determine the impact of the training program on the behavior of the participants when they return to their own facilities.

HRP-0901932/4 PC **A03**/MF **A01**
American Academy of Physicians' Assistants, Arlington, VA.
The Development of Standards to Ensure the Competency of Physician Assistants. Volume I: Summary Report.
Final rept. 1 Jul 76-14 Aug 79.
1979, 43p
Contract PHS-HRA-231-76-0053
See also Volume 2, HRP-0901933.

The specific objectives of its study to develop standards to ensure PA competence were to verify the competencies requisite for the entry level generalist position; identify PA practitioner positions which are other than that of the entry level generalist and, if necessary, establish a position classification system and role delineation for each position identified; develop a criterion-refererences self-assessment tool, and pilot test it on a sample of graduate PA's; design a system of accreditation of continuing education programs for PA's; and develop a roster of accredited continuing education programs for PA's. The study recommended that an effective competency assurance program would integrate all the components of competency assurance, base the role delineation model on factors that would keep up with advances in medical knowledge, develop a national profile of the PA profession, continue to develop and refine self-assessment mechanisms for PA's, develop descriptive learning packages, and attempt to determine, by means of some kind of checklist, whether PA's were using in practice what they had learned at continuing medical education programs. In 1976, the American Academy of Physician Assistants proposed to further refine both the physicians' as-

sistant (PA) role and continuing medical education for PA's, two concepts developed in the 1960's.

HRP-0901933/2 PC **A06**/MF **A01**
American Academy of Physicians' Assistants, Arlington, VA.
The Development of Standards to Ensure the Competency of Physician Assistants. Volume II: Role Delineation for the Physician Assistant.
Final rept. 1 Jul 76-14 Aug 79.
1979, 103p
Contract PHS-HRA-231-76-0053
See also Volume 4, HRP-0901934.

A role delineation consists of the major and specific responsibilities a practitioner (in the case, a physician's assistant or PA) should be competent to accomplish. The role delineation given here is that for an entry level position in primary care, the only type of PA position in practice; that is, there is no advanced PA position. Eleven major responsibilities for the competent PA are defined: elicit the medical and psychosocial history, perform the physical examination, establish the preliminary diagnosis of common problems, order the screening and diagnostic tests, perform the screening and diagnostic tests, interpret the raw data from screening and diagnostic tests, validate the preliminary diagnosis of common problems, formulate a management plan for common problems, provide the treatment of common problems, and initiate the medical therapies and procedures. Also provided is a complete role delineation that lists all the tasks that PA's should be competent to perform.

HRP-0902399/5 PC **A03**/MF **A01**
National Health Care Management Center, Philadelphia, PA.
Long-Term Support Systems: An Analysis of Health Systems Agency Plans,
Stanley J. Brody, and Anna Belle Woodfin. Nov 79, 43p NHCMC ISSUE PAPER-5
Contract PHS-HS-02577
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

This paper presents an analysis of the early efforts of Health Systems Agencies to plan for a long-term care system within the framework provided by Public Law 93-641, The National Health Planning and Resources Development Act of 1974. The analysis is based on data derived from an August 1978 study of 42 Health Systems Plans. This analysis was undertaken because demographic data and the current status of long-term care/support provide compelling evidence that thoughtful planning is necessary if the future social and medical needs of the elderly and chronically disabled are to be met. The authors do not believe that current planning sufficiently addresses the array of needs facing the elderly population; yet, that population is accelerating. Population projections anticipates that 24.9 million Americans will be over 65 years old by 1980, 29.8 million by 1990, and about 31.8 million by the year 2000. More importantly, the age structure of the 65+ population is changing.

HRP-0902400/1 PC **A03**/MF **A01**
Southern Regional Education Board, Atlanta, GA.
Creating New Allied Health Programs: Considerations and Constraints,
Pat Malone. 1979, 31p
Grant PHS-AH-90131

This publication is designed for academic administrators who have had limited orientation to the allied health disciplines. It explores some of the factors which make the health disciplines differ from the traditional and career-oriented collegiate disciplines, some of the trends which will affect the allied health disciplines, and some of the considerations needed to make thoughtful assessments in the development of new allied health education programs.

HRP-0902415/9 PC **A21**/MF **A01**
Bergen-Passaic Health Systems Agency, Hackensack, NJ.
Health Systems Plan and Annual Implementation Plan for 1980. Health Service Area 1 New Jersey. Third Edition.
10 Jan 80, 497p
See also HRP-0901639. Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The Health Systems Plan (HSP) is a statement of the HSA's sense of community needs concerning the health of area residents and how the health systems should respond to meet those needs. The Health Systems Plan is a population-based planning document in the sense that the need for any health service is directly related to the health status of the area's population. To this end the HSA's needs are expressed in goals, objectives, and long range actions. As part of the federal mandate, the Bergen-Passaic Health Systems Agency is responsible for developing an Annual Implementation Plan (AIP) which delineates those changes in the health care system toward which the HSA will work the coming year.

HRP-0902425/8 PC **A05**/MF **A01**
Orange County Health Planning Council, Tustin, CA.
Current Directions in End-Stage Renal Disease Services, 1979-1981.
c1979, 97p
Grant PHS-09-P-00098-03-0

The Social Security Amendments of 1972 (Public Law 92-603) established reimbursement under Medicare for virtually everyone requiring end-stage renal disease (ESRD) services. Subsequent to the passage of this law, there were significant changes in the delivery of both kidney transplant and chronic renal dialysis services. This revision of Current Directions in End-Stage Renal Disease Services, a component of the Health Systems Plan developed by the Orange County Health Planning Council (OCHPC), discusses the present status of the ESRD system in Orange County, describes available services and delineates future requirements for services. Also included is a discussion of the cost, accessibility and quality aspects of the delivery of ESRD services. This document addresses the 24-month planning time frame for ESRD services which has been mandated by the state.

HRP-0902426/6 PC **A03**/MF **A01**
Eastern Carolina Health Systems Agency, Greenville, NC.
Consumer Guide to Nursing Homes in Eastern North Carolina.
1980, 46p

This resource book is an aid to persons facing the dilemma of choosing care for the elderly person. It presents brief sketches of alternatives to nursing home care and available services (names, addresses, phone numbers) that are within the health service area. A procedure for selecting a nursing home is provided: assessing the need; checking the financing, staff, location, and visitation schedules; and preparing the patient. The available facilities offering different levels of care are explained and possible methods for financial assistance are suggested. When selecting a home, many factors have to be considered: location, ownership, licensure, physical structure, staffing, services offered, rates and charges, and the handling of complaints of the resident. Appendices include definitions; a patient's bill of rights; listings of area nursing homes, area homes for the aged, area family care homes, and home health agencies and services offered; and a checklist.

HRP-0902427/4 PC **A02**/MF **A01**
Western Center for Health Planning, San Francisco, CA.
Pesticides and Rural Health Planning,
Vivian Lin. Jul 80, 13p TECHNICAL ASSISTANCE MEMO-66
Contract PHS-HRA-232-79-0037

Pesticides, widely used in agricultural and forestry areas, expose rural residents and workers to a wide range of hazardous substances. Many health problems caused by pesticide exposure go untreated or unrecognized due to lack of knowledge, inadequate medical care, cultural and language barriers, poor reporting of cases, and pressure from growers and pesticide users. Health Systems Agencies can play an important role in identifying the extent of the problem and needed services. Implementation strategies include: (1) cooperation with other agencies studying health problems associated with pesticide use; (2) consumer education and involvement; (3) training of health care providers; (4) encouragement of needed services within existing institutions; and (5) consideration of pesticide problems during agency reviews. Bibliography, list of selected Federal offices in Regions VIII, IX, and X, and other contacts for protection from pesticide poisoning.

HRP-0902428/2 PC **A11**/MF **A01**
Metropolitan Council, St. Paul, MN.
Twin Cities Metropolitan Area Emergency Medical Services Plan.
Mar 80, 242p PUB-51-80-034
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

This regional emergency medical services (EMS) plan recommends goals and guidelines for a coordinated system of care which would help reduce costs by encouraging efficient use of resources and avoiding unnecessary duplication of services. The public issue guidelines are intended for use by those developing public information and education programs in evaluating accessibility to EMS in their communities, in assessing needs, and in developing program priorities for funding requests. The prehospital system plan addresses guidelines and recommendations to facilitate coordination. These include: first responders, basic and advanced life support ambulances, and response time goals. The critical care unit presents goals, guides, definitions and bibliographies on specialty care areas: perinatal, cardiovascular, trauma, spinal injury, burn, poison information and treatment, and triage and transfer. The primary functions of the communications system are presented: citizen access, dispatch, and hospital-ambulance. A medical control plan is defined; the role and responsibilities of physicians, nurses, paramedics, and emergency medical technicians are described; and recommendations on how the system should be organized are made. The EMS system management section gives recommendations for ensuring long-term coordination by describing the role that county and regional government should have in the system. Charts, tables, and definitions are included.

HRP-0902429/0 PC **A03**/MF **A01**
Comprehensive Health Planning of Northwest Illinois, Inc., Rockford.
Rationale for the Merger of Kishwaukee and Sycamore Hospitals: A Background Paper for Consideration by the DeKalb County Health Planning Committee.
8 Apr 80, 45p

A history of the development of the two community hospitals, a description of them, and the background to the concept of the merger are presented. Reasons the residents of the area should be concerned are that costs have skyrocketed for both hospitals and on the average, less than half the beds are filled, showing inefficiency resulting from duplication of services. The financial situation of the hospitals and the rationale for rates the two sets of residents have to pay are analyzed. Other factors show that competition has not made any decrease in costs, duplication and inefficiency are costing real dollars, and there is no free market system among hospitals. The inability of the doctors to get along has been a major barrier to merger, depriving the population of a better, lower cost system. Significant community savings for hospital care, especially in the areas of manpower, equipment, and physcian remuneration, would result from a merger based on the end of duplication of services, economies of scale, and less census variation. Nonfinancial benefits of the merger would include an integrated comprehensive system with more services and better quality, allowing for more cooperation and continuity of care.

HRP-0902430/8 PC **A02**/MF **A01**
West Michigan Health Systems Agency, Grand Rapids.
An Overview of Respite Care Programs: Staff Paper.
Mar 80, 21p STUDY-80-6
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

This examination of different ways to develop respite care programming, an alternative to the burden of parental care of a developmentally disabled child, can be valuable in the stimulation of implementation of these programs. The difference

in the definition of developmental disability (DD) by the State of Michigan and Congress is discussed, which allows for the different interpretations in dealing with the problem. Five types of respite care programs are given and models furnished: (1) institutional care, (2) the respite care center, (3) home-based care, (4) licensed foster care, and (5) parent cooperative care. These programs have similar elements that are necessary for an effective respite care program: (1) funding based on Federal, state, and/or local level; (2) services of a professional coordinator; (3) a structure that appears to be well-organized, offers training, and follows legal guidelines and procedures; (4) sponsorship of organizations mandated to serve the DD; (5) goals of improved mental health of family systems; (6) cost-effectiveness; and (7) continuity of care. As for the differences, each program is unique in that it has the potential of serving a slightly different subgroup of DD population. Respite care generally offers cost-effective service with maximum benefits to participants and community. An appendix is included.

HRP-0902434/0 PC **A02**/MF **A01**
West-Central Ohio Health Systems Agency, Lima.
Physicians' Perceptions of the Need for Primary Care Physicians in West-Central Ohio.
Feb 80, 15p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The West-Central Ohio health systems plan states that 'the arbitrary figure of one primary care physician per 2,000 persons has been selected as the appropriate, and practical ratio...' This ratio has been met with criticism, and in response, the Health Systems Agency (HSA) staff surveyed the local physicians. The purposes of the survey were to determine the local physicians' perceptions of the need for primary care physicians in that health service area and to determine who actually practices primary care, especially among the Internal Medicine specialists. Surveys were sent to all 320 physicians in the nine county area; 47.2 percent returned responses. Sixty-five percent of the responders perceived a need for more primary care in the area, with specific counties perceiving a need by a particularly high percentage. The survey has been an aid to manpower planning in west-central Ohio by its confirmation of the general feeling expressed by consumers that more primary care physicians are needed. Based on the survey results, this HSA will develop a need formula for primary physicians in the categories of primary care and family practice. A questionnaire is included.

HRP-0902436/5 PC **A03**/MF **A01**
North Central Florida Health Planning Council, Inc., Gainesville.
A Health Agency Perspective on the Development of Community-Based Intermediate Care Facilities for the Mentally Retarded (ICF/MR),
Sioux Remer. 12 Apr 79, 34p
Presented at the American Health Planning Association Annual Meeting, June 1979.

Definitive plans, standards, and criteria need to be developed to enable Florida's Health Systems Agencies to effectively and appropriately review proposals for intermediate care facilities for the mentally retarded (ICF/MR). Facility size, design, location, and bed need methodology are problem areas identified in the study and some resolutions are offered. The facility size and design should provide for the most cost-effective home life environment. The facility location should consider the availability of the specialized labor force and the potential for communities to develop support services and programs. The ICF/MR Bed Need Policy should be revised and evaluated considering the habilitative needs and availability of services in the home districts. The current bed need is apportioned according to the percent of the state's general population in a health service area. A better allocation of community ICF/MR placement would be according to the proportion of the state's total retardation program client population residing in the area. The history and development of Florida's state facilities for the developmentally disabled/mentally retarded are discussed. The development of ICF/MRs will provide the eligible clients with a more appropriate, less restrictive environment than is currently available. Tables and attachments are included.

HRP-0902437/3 PC **A99**/MF **A01**
Central Minnesota Health Systems Agency, St. Cloud.
Health Systems Plan for 1980. Health Service Area 4 Minnesota. 3rd Edition.
20 Dec 79, 645p
See also report dated 25 Jan 79, HRP-0901800, and HRP-0902438.

The primary mission of the Central Minnesota Health Systems Agency (CMHSA) is the cooperative development of a health care system which can effectively address the health care needs and concerns of residents of Central Minnesota.

HRP-0902443/1 PC **A04**/MF **A01**
West Michigan Health Systems Agency, Grand Rapids.
Compilation of Documents Relating to Emergency Medical Services Planning in West Central Michigan: Staff Paper.
Mar 80, 51p STUDY-80-3
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

This document is a compilation of emergency medical services (EMS) goals, objectives, conclusions and recommendations from existing West Michigan Health Systems Agency (WMHSA) adopted or draft EMS-related documents. It focuses primarily on the areas of vehicles and their personnel, training, communications, hospital facilities and their personnel, consumer participation and education, access, record keeping and evaluation, and disaster linkages. The 'recommendations' in this document are not all phrased as recommendations because they consist of statements from other documents which are not all phrased similarly. Recommendations abstracted in this paper encourage the establishment of a solid basic EMS system, although some statements are made regarding advanced EMS systems.

N80-32069/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Therapeutic Gymnastics in Comprehensive Treatment of Patients with Generalized Myasthenia.
R. L. Kapelovich. Aug 80, 9p NASA-TM-76312
Contract NASW-3198
Transl. Into English from Vop. Kurortol., Fizioter. Lech Fiz. Kul' T. (USSR), No. 5, Sep. - Oct. 1979 p 41-45. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By I. M. Sechenov First Moscow Medical Inst.

The technique of therapeutic gymnastics was used for patients with mayasthenia gravis to control the consequences of hypodynamia induced by the myasthenic process. It is concluded that during myasthenia, the severity of the disease is due to the affection of the cross striated musculature. The most life threatening are the disorders in respiration and swallowing, that can be intensified by forced stay in bed and immobility. It is also concluded that the use of therapeutic gymnastics in patients which myasthenia promotes efficient presurgical preparation, and in the post surgical period; prevention of pulmonary complications and normalization of respiration. Therapeutic gymnastics with regard to the severity and localization of the myasthenic disorders must be a component part of the presurgical preparation and postsurgical management of patients with generalized myasthenia.

N80-32073/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Certain Features of the Cochleovestibular Syndrome in the Residual Stage of Traumatic Brain Disease.
M. I. Garshin, and V. Y. Volyanskiy. Aug 80, 12p NASA-TM-76337
Contract NASW-3198
Transl. Into English from Vestn. Otorino-Laringol. (USSR), No. 2, Mar.-Apr. 1980 p 37-41. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prepared by Psychoneurological Clinic, Odessa.

Caloric and rotation tests were applied to the study of the vestibular analyser in 84 patients in the residual state of traumatic disease of the brain. Vestibular disturbances of different degree revealed in 79 patients were as a rule accomplished by cochlear derangement. In the majority of patients the vestibular syndrome was supratentorial with the involvement of the diencephal-hypothalmic, subcortical, and cortical levels of the brain. Vestibular dysfunction correlated with such factors as severity of the sustained craniocerebral traum, duration of the posttraumatic period, and, particularly, with the character of the residual neurological syndrome. In accordance with the latter, it is recommended that vestibular disturbances be treated in the residual period of closed craniocerebral injuries with due regard for the principal pathophysiological mechanisms of the underlying neurological syndrome.

N80-32074/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Diagnosis of Latent Forms of Labyrinthine Affections.
V. P. Vasiliyeva. Aug 80, 10p NASA-TM-76338
Contract NASW-3198
Transl. Into English from Vestn. Otorino-Laringol. (USSR), No. 3, May-Jun. 1980 p 22-27. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prepared by I.M. Sechenov First Moscow Medical Inst.

Features and significance of individual vestibular symptoms for the diagnosis of latent labyrinthitis and limited forms of labyrinthine affections offering considerable difficulties are discussed. Vestibular symptoms are indistinct. In case of the negative fistular symptom the greatest significance is acquired by the study of posture nystagmus according to the results of electronystagmograms, changes of tonic reactions and statics, as well as data of experimental vestibular tests. The necessity of evaluation of all the vestibular symptoms from the point of view of their vector characteristics and in a complex of evidence obtained by otoneurological examination of the patient is emphasized. Delicate topic and differential diagnosis of vestibular disturbances is of great importance and significance in the choice of the conservative or surgical method of treatment.

N80-32076/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Review of Book-Ultrasound in Otorhinolaryngology.
I. V. Soldatov. Aug 80, 8p NASA-TM-76349
Contract NASW-3198
Transl. Into English from Zh. Ushnykh Nosovykh Gorlovykh Bolez. (USSR), No. 3, May - Jun. 1979 p 86-87. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By USSR Academy of Medical Sciences.

Ultrasonic therapy for certain diseases is discussed. Success is reported in the treatment of chronic tonsilitis, sinusitis, and Meniere's disease.

N80-32078/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Review of Book Vestibular Crises.
N. S. Blagoveshchenskaya. Aug 80, 5p NASA-TM-76354
Contract NASW-3198
Transl, into Engligh from Vestn. Otorino-Laringol. (USSR), No. 1, Jan. - Feb. 1980 p 36-77. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The etiology, pathogenesis, clinical practice, treatment and rehabilitation of patients with vestibular crises is discussed. Classifications for vestibular disorders are given. Information on the frequency of vestibular crises is given.

PB81-110538 PC **A07**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
National Hospital Rate-Setting Study: A Comparative Review of Nine Prospective Rate-Setting Programs. Annual Report (1st).
Interim rept.,
Diane Hamilton, Renee Walter, Jerry Cromwell, Eve Horowitz, and Gilbey Kamens. Aug 80, 148p
DHHS/PUB/HCFA-80-03061
Contract DHEW/HCFA-500-78-0036

The National Hospital Rate-Setting Study is the most comprehensive study of hospitals undertaken to date. Within the study, a broad array of data will be assembled on more than half the short-term general hospitals in the United States and used to examine many important aspects of hospital behavior and performance -- finances, scope and composition of services, resource utilization, productivity, patient outcomes, organizational structure, and financial management. In addition, the study will examine the accessibility of hospital care to various socioeconomic groups as well as the overall structure of the hospital industry (entries, closures, mergers, and degree of market concentration and specialization). The prospective reimbursement programs selected for study are: Arizona, Minnesota, Connecticut, New York, Maryland, New Jersey, Massachusetts, Washington, Western Pennsylvania. This report compares the salient characteristics of these nine prospective reimbursement programs, with emphasis on the adoption, implementation, and review processes, legal issues, and stringency and equity characteristics.

PB81-112799 PC **A07**/MF **A01**
Health Care Financing Administration, Baltimore, MD. Office of Research, Demonstrations, and Statistics.
Health Care Financing Review, Summer 1979. Volume 1, Issue 1.
Quarterly rept.,
Robert M. Gibson, Mark S. Freeland, Gerard Anderson, Carol Ellen Schendler, and Ira L. Burney. Aug 79, 148p DHEW/PUB/HCFA-79/03002
See also PB81-112807.

Contents:
- National Health Expenditures, 1978;
- National Hospital Input Price Index;
- Medicare and Medicaid Physician Payment Incentives;
- Analysis of variations in hospital use by medicare patients in PSRO areas, 1974-1977.

PB81-112823 PC **A06**/MF **A01**
Health Care Financing Administration, Baltimore, MD. Office of Research, Demonstrations, and Statistics.
Health Care Financing Review, Summer 1980. Volume 2, Number 1.
Quarterly rept.,
Robert Gibson, Janet Mitchell, Jerry Cromwell, Korbin Liu, and Jana Mossey. Sep 80, 103p DHEW/PUB/HCFA-80/03054
See also PB81-112815.

Contents:
- National health expenditures, 1979;
- Medicaid mills--fact or fiction;
- The role of payment source in differentiating nursing home residents, services, and payments;
- Hospital-based physicians--current issues and descriptive evidence.

PB81-113490 PC **A03**/MF **A01**
Bureau of Radiological Health, Rockville, MD.
The Selection of Patients for X-Ray Examinations: The Pelvimetry Examination.
Final rept.
Jul 80, 36p FDA/BRH-80/128, DHHS/PUB/FDA-80-8128

This pelvimetry statement is the first in an anticipated series of referral criteria or statements on use that will be developed by various panels evaluating the use of specific diagnostic radiological procedures. The pelvimetry x-ray examinations is the first medical radiation procedure to be considered by a Bureau-convened physician panel. The panel, composed of obstetricians and radiologists, evaluated the available literature on the efficacy of pelvimetry and drafted a statement on use which summarized its findings. The panel statement was then reviewed by the American College of Radiology and the American College of Obstetricians and Gynecologists. Although formal endorsement by medical organizations is not a necessary element in the general referral criteria effort, these two organizations did so in this case, and their formal policies appear in this document.

PB81-800138 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Venereal Diseases. 1964-September, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Sep 80,
Elizabeth A. Harrison. Oct 80, 120p
Supersedes PB80-800071, and NTIS/PS-78/1024.

The bibliography cites reports on diagnosis, medical research, pathology, clinical medicine, immunology, and epidemiology of venereal diseases. Specific diseases covered are gonorrhea, granuloma inguinale, lymphogranuloma venereum, neurosyphilis, syphilis, and tabes dorsalis. (This updated bibliography contains 114 citations, 7 of which are new entries to the previous edition.)

6F. Environmental Biology

N80-31969/2 PC **A18**/MF **A01**
University of Central Florida, Orlando. Dept. of Biological Sciences.
A Continuation of Base-Line Studies for Environmentally Monitoring Space Transportation Systems (STS) at John F. Kennedy Space Center. Volume 4: Threatened and Endangered Species of the Kennedy Space Center. Part 1: Marine Turtle Studies.
Final Report, 1976 - 1979.
L. M. Ehrhart. Sep 80, 417p NASA-CR-163122-V-4-PT-1, TR-51-2-V-4PT-1
Contract NAS10-8986

The status of marine turtle populations in the KSC area was studied using data from previous results from ground and aerial surveillance conducted from 1976 to April 1979. During ground surveillance, various data were recorded on emergent turtles such as: species, weight, tag number (if previously tagged), time discovered, activity at discovery and the location of discovery. Observations were also made on nesting and reproductive characteristics, population estimates, immigration and emigration and growth rate of the turtles. Mortality studies were additionally made and autopsies performed on dead turtles found in the area. It is concluded that further mortality documentation should be done just prior to and just after a future space launch operation in order to accurately assess the cause and effect relationship of such a launch on the turtle population.

N80-31970/0 PC **A07**/MF **A01**
University of Central Florida, Orlando. Dept. of Biological Sciences.
A Continuation of Base-Line Studies for Environmentally Monitoring Space Transportation Systems (Sts) at John F. Kennedy Space Center. Volume 4: Threatened and Endangered Species of the Kennedy Space Center. Part 2: Threatened and Endangered Birds and Other Threatened and Endangered Forms.
Final Report, Sep. 1976 - Apr. 1979.
L. M. Ehrhart. Sep 80, 148p NASA-CR-163122-V-4-PT-2, TR-51-2-V-4-PT-2
Contract NAS10-8986

Data are presented which were collected by ground and aerial surveillance of 37 species of birds observed within the environs of KSC which are on lists of rare and endangered biota in Florida. Additional information was obtained on other threatened species such as the West Indian manatee, the salt marsh snake, the Indigo snake, the Gopher tortoise, the American alligator, and the Florida mouse. Results of the literature search were used to obtain a historical perspective and aid in the analysis of the field data collected.

PB81-105892 PC **A02**/MF **A01**
National Heart, Lung, and Blood Inst., Bethesda, MD.
Fate of Selected Fungicides in a Terrestrial Laboratory Ecosystem.
Journal article,
Jay D. Gile, and James W. Gillett. 1980, 8p EPA-600/J-79-115
Pub. in Agricultural and Food Chemistry, p1159-1164 Nov-Dec 79.

The disposition of (14)C-labeled pentachloronitrobenzene (PCNB), two of its analogues pentachlorophenol (PCP) and hexachlorobenzene (HCB), and captan was examined as seed-protectant coatings in a terrestrial microcosm chamber (TMC) in comparison to a reference compound, dieldrin (HEOD). The TMC contained a synthetic soil medium, agricultural crops, numerous invertebrates, and a gravid gray-tailed vole (Microtus canicaudus). Captan and PCP degraded more rapidly in soil and plants than did PCNB, which was degraded somewhat more quickly than HCB and HEOD. By 45 days postplanting, total soil residues (parent + metabolites + bound residues) had declined from a nominal 3 ppm to about 1 ppm for all chemicals but captan (0.26 ppm), while parent residues become undetectable for PCP and captan. Residues in invertebrates and the vole were low for all chemicals, but HCB and HEOD showed ecological magnification indices (EMs) in the vole of 17.7 and 2.1 respectively, as compared to 1.2 for PCNB. None of the chemicals adversely affected vole survival, although the PCNB-exposed vole had no surviving pups. Only HEOD greatly decreased cricket survival.

PB81-108854 PC **A12**/MF **A01**
Cornell Univ., Ithaca, NY.
Effect of Chemical and Physical Properties of Organic Compounds on Their Biodegradation, Summary of Research: 1975-1978,
M. Alexander, and R. K. Finn. 1978, 258p NSF/RA-790055
Grant NSF-AEN75-19797

Several generalizations have been established concerning the effect of properties of organic compounds on the rate of their biodegradation. Concentration in the water phase was found to be of great importance in determining the rate of biodegradation of organic compounds, including toxicants, or whether there was biodegradation of all. Methods were established to assess degradation at extremely low chemical concentrations in samples of natural environments. Sorption onto colloidal materials was noted to markedly alter the rate of degradation, and the rate of desorption influenced the rate of microbial attack on such bound chemicals. Preadaptation by microorganisms to more readily degradable or less toxic analogues was observed often to enhance the rate of degradation of certain resistant organic molecules, although the addition of some organic compounds did not improve the biodegradation rate. Generalizations were also established on the effect of halogenation on the biodegradation of aliphatic and aromatic compounds. A novel mechanism for the microbial destruction of organic compounds containing the C-P bond was established, and a new means was found for the microbial release of alkanes from organic precursors. The role of environmental characteristics in retaining phosphorus compounds and in affecting the rate of microbial attack on them was established.

PB81-109738 PC **A03**/MF **A01**
Johns Hopkins Univ., Baltimore, MD. Chesapeake Bay Inst.
Terrestrial Flora and Fauna in the Vicinity of the Delmarva Power and Light Station and Proposed Expansion Site.
Special rept.,
Marie Van Deusen, and Robert G. Otto. Apr 80, 43p CBI/SR-77, REF-79-8
Sponsored in part by Maryland Dept. of Natural Resources, Annapolis. Power Plant Siting Program.

The results of field surveys of the terrestrial vegetation, birds and mammals in the vicinity of the Delmarva Power and Light Company Vienna Steam Electric Station and proposed expansion area in Dorchester County, Maryland are presented. Four major habitats were identified: forest, oldfield, marsh and cultivated land. Qualitative surveys of flora and fauna were conducted to determine species present. Commercially important waterfowl, upland game birds and mammals and furbearers are discussed.

PB81-110629 PC **A03**/MF **A01**
Johns Hopkins Univ., Baltimore, MD. Chesapeake Bay Inst.

Patterns of Distribution and Abundance of Macrobenthos at Taylors Island, Maryland with Implications for Monitoring Programs.
Special rept.,
Leslie S. Kaufman, D. Scott Becker, and Robert G. Otto. Apr 80, 47p CBI/SR-81, REF-80-4

Macrobenthic assemblages in the region of the proposed power plant intake-discharge structure at Taylors Island, Maryland are described in such a way as to distinguish between-habitat, within habitat and habitat-unrelated patterns of distribution and abundance. Sampling, using diver-operated suction dredges, was stratified on the basis of preliminary surveys, which revealed a sandy inshore habitat crossed by a narrow tongue of organism-rich silty-sands in the center of the study area. Sandy and silty-sand habitats differed markedly in associated macrobenthos.

PB81-110892 PC **A09**/MF **A01**
Johns Hopkins Univ., Baltimore, MD. School of Hygiene and Public Health.
Benefits of Maintaining a Chlorine Residual in Water Supply Systems.
Final rept. Jul 76-Jan 79,
Michael C. Snead, Vincent P. Olivieri, Cornelius W. Kruse, and Kazuyoshi Kawata. Jun 80, 190p EPA-600/2-80-010
Grant EPA-R-804307

The protection afforded the water consumer by the maintenance of a chlorine residual in water distribution systems was evaluated in laboratory holding tanks and reservoirs and existing municipal water distribution systems. In the laboratory studies, tap water, adjusted to the appropriate pH, temperature, and chlorine residual, was challenged with varying levels of autoclaved sewage seeded with Shigella, Salmonella coliforms, poliovirus 1, and f2 bacterial virus. Comparative survivals of these microorganisms were evaluated over two hour periods. As expected microbial inactivation was increased by lower pH, higher temperature, higher initial chlorine concentration, and lower sewage concentration. An initial free chlorine concentration was more effective than an equivalent initial combined chlorine residual. The maintenance of a free chlorine residual was found to be the single most effective measure for maintaining a low plate count in the distribution system. More than 6000 plate count isolates were studied and classified into functional groups based on seven biochemical characteristics.

PB81-112625 PC **A04**/MF **A01**
Syracuse Univ., NY. Dept. of Civil Engineering.
Development of a Simple Means for Predicting Algal Blooms,
Simon Litten, Steven W. Effler, and Michael Meyer. Sep 80, 56p W81-00018, OWRT-B-087-NY(1)
Contract DI-14-34-0001-9086

A simple technique to predict the future occurrence of algal blooms was evaluated for seven test lake systems proximate to Syracuse, NY during the summer of 1978 and 1979. The selected test systems represent a broad range of trophic status, from mesotrophic to hypereutrophic. The technique includes a simple filtering process followed by the identification of the color imparted to the filter, based on comparison to National Bureau of Standards' color chips. The reference measure of phytoplankton standing crop was chlorophyll-a. Particular colors of filtered particulates were not demonstrated to be useful estimators of chlorophyll-a concentration, though the hues olive and yellow-green were associated with higher chlorophyll-a levels. The particulate color method was demonstrated to be useful in following certain physical/chemical changes in a lake.

SERI/RR-744-311 PC **A05**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Economic Measurement of Environment Damages.
F. Krawiec. May 80, 78p
Contract AC02-77CH00178

The densities, energy consumption, and economic development of the increasing population exacerbate environmental degradation. Air and water pollution is a major environmental problem affecting life and health, outdoor recreation, household soiling, vegetation, materials, and production. The literature review indicated that numerous studies have assessed the physical and monetary damage to populations at risk from excessive concentrations of major air and water pollutants-sulfur dioxide, total suspended particulate matter, oxidants, and carbon monoxide in air; and nutrients, oil, pesticides, and toxic metals and others in water. The measurement of the damages was one of the most controversial issues in pollution abatement. The methods that have been used to estimate the societal value of pollution abatement are: (1) chain of effects, (2) market approaches, and (3) surveys. National gross damages of air pollution of $20.2 billion and of water pollution of $11.1 billion for 1973 are substantial. These best estimates, updated for the economic and demographic conditions, could provide acceptable control totals for estimating and predicting benefits and costs of abating air and water pollution emissions. The major issues to be resolved are: (1) lack of available noneconomic data, (2) theoretical and empirical difficulties of placing a value on human life and health and on benefits such as aesthetics, and (3) lack of available demographic and economic data. (ERA citation 05:032759)

6G. Escape, Rescue, and Survival

PAT-APPL-6-166 413 PC **A02**/MF **A01**
Department of the Navy Washington DC
Maximum Depth Monitoring Apparatus.
Patent Application,
Peter F. Berdzar, and Robert S. Acks. Filed 7 Jun 80, 19p AD-D007 452/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

In a diver safety apparatus, a depth monitoring device is included for monitoring the maximum depth of a diver during the period that the diver is submerged in an underwater environment. A maximum depth display is coupled to the depth monitor to enable the diver to quickly determine, at any given time during the period, his maximum depth of submergence up to such given time. When the diver reaches a preselected critical maximum depth, an audio alarm coupled to the depth monitor is activated to alert the diver. (Author)

6H. Food

AD-A089 359/4 Not available NTIS
Utah State Univ Logan Dept of Nutrition and Food Science
Effects of Long-Term Storage on Quality of Processed Foods. I. Meal, Ready-to-Eat, Individual Ration Items Packed in Flexible Retortable Pouches,
D. K. Salunkhe, M. T. Wu, and J. Y. Do. 28 Dec 78, 30p
Contract DAAG17-73-C-0288
See also AD-A089 360.
Availability: Pub. in Jnl. of Food Quality, v2 p75-103 1978 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A089 360/2 Not available NTIS
Utah State Univ Logan Dept of Nutrition and Food Science
Effects of Long-Term Storage on Quality of Processed Foods. II. Freeze-Dehydrated Ration Items in Vacuum-Packed Flexible Pouches,
D. K. Salunkhe, M. T. Wu, and J. Y. Do. 29 Jan 79, 21p
Contract DAAG17-73-C-0288
See also AD-A089 359.
Availability: Pub. in Jnl. of Food Quality, v2 p157-176 1979 (No copies furnished by DTIC/NTIS).

No abstract available.

PB81-108193 PC **A04**/MF **A01**
North Carolina Univ. at Chapel Hill.
The Washing of Fish: A Literature Assessment,
Freda A. Ramey, Joyce A. Taylor, and Frank B. Thomas. 1979, 71p UNC-SG-79-07, NOAA-80090801
Grant NA79AA-00048
Portions of this document are not fully legible.

In the simple procedure of washing of fish, ample evidence has been revealed that practically no evaluation of equipment efficiency has ever been demonstrated. Major fishing countries indicate most fish washing equipment is of local design and construction. Whether or not the equipment is effective or to what degree has never been determined. Technologists in fisheries utilization with training in sanitary engineering and related sciences have many areas of concern relating to construction materials, contact time, water temperature, water reuse or recycling, water pressure, spray pattern and nozzle, if used, water quality and composition. The available literature on washing of fish as it related to quality, shelflife, equipment used, and related areas, is examined and listed.

PB81-108557 PC **A02**
North Carolina Univ. at Chapel Hill.
Occurrence of Enteric Bacteria and Viruses in Oysters,
Mark D. Sobsey, Cameron R. Hackney, Robert J. Carrick, Bibek Ray, and Marvin L. Speck. c1980, 5p UNC-SG-R-154, NOAA-80090910
Grant NOAA-04-6-158-44054
Pub. in Jnl. of Food Protection, v43 n2 p111-113 Feb 80. Prepared in cooperation with North Carolina State Univ. at Raleigh. Dept. of Food Science.

Enteric bacteria and virus levels were determined in oysters from paired stations that were opened or closed for commercial shellfishing on the basis of total coliform levels in the water. Six pairs of stations were sampled quarterly over a 1-year period. Enteric viruses were found in 3 of 24 50-g oyster sampled from closed areas and in none of 23 samples from open areas. Salmonella was found in 2 of 47 samples of 40 g each, one from an open and the other from a closed area. Although enteric pathogens of fecal origin were found only in oysters that exceeded the recommended market limit of 230 fecal coliforms per 100 g of meat, the fecal coliform levels in some virus-positive samples were much lower than those in Salmonella-positive samples: Vibrio parahemolyticus levels were similar in oysters from both open and closed beds, indicating no particular association with fecal pollution.

PB81-112393 PC **A02**
Texas A and M Univ., College Station.
Bacterial Indicators and Environmental Factors as Related to Contamination of Oysters by Enteroviruses,
Charles P. Gerba, Sagar M. Goyal, Irina Cech, and Gregory F. Bogdan. c1980, 6p TAMU-SG-80-812, NOAA-80061202
Grant NOAA-04-7-158-44105
Pub. in Jnl. of Food Protection, v43 n2 p99-101 Feb 80. Prepared in cooperation with Baylor Coll. of Medicine, Houston, TX., and Texas Univ., Houston. School of Public Health.

Results of studies conducted along the upper Texas Gulf coast, where a substantial amount of quantitative virological data was collected, are compared to bacteriological indicators and other environmental factors on a statistical basis. Presence of viruses in water was not found to be correlated with presence of viruses in oysters. Multiple regression analysis showed that approximately 25% of the variance in the number of viruses detected in water was statistically accounted for by the linear correlation with the total coliforms in oysters. The amount of variation in the number of viruses explained by this indicator, however, was not large enough to make the concentration of coliforms in oysters a good predictor of the concentration of viruses in water. Furthermore, none of the bacterial or other environmental variables was found to be a good predictor of the concentration of viruses detected in oysters. Failure to find a strong predictive relationship between viruses in marine water and in oysters, and the occurrence of viruses in high frequency in waters which met current bacteriological standards, indicate that these standards do not reflect the occurrence of enteroviruses in marine waters.

6J. Industrial (Occupational) Medicine

PB81-112112 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Technical Assistance Report TA 79-19, Good Samaritan Hospital, Cincinnati, Ohio,
G. E. Burroughs, and N. P. Shutte. Jun 80, 8p NIOSH-HE/TA-79-19

An environmental survey was conducted on May 10, 1979 at Good Samaritan Hospital (SIC-806) in Cincinnati, Ohio. The director of Safety and Security at the hospital requested the investigation to determine the hazards presented by elemental mercury (7439976) exposure in areas where instruments using this substance are used or repaired. Time weighted average (TWA) exposures were measured and various locations were surveyed to determine possible sources of mercury contamination. One TWA measurement indicated an exposure equivalent to the OSHA standard of 100 micrograms per cubic meter (micrograms/cu m), but the cause for this reading was the breakage of a thermometer which contaminated the nurse's uniform. Other TWA measurements ranged from 5 to 23 micrograms/cu m. In a few locations, where mercury droplets were thought to collect, measurements made by a direct reading mercury analyzer ranged from less than 10 to greater than 1,000 micrograms/cu m. The authors conclude that no health hazard from mercury exposure exists at the hospital. They recommend continuation of good work practices exists at the hospital. They recommend continuation of good work practices and implementation of additional safety precautions.

PB81-112120 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Hazard Evaluation and Technical Assistance Report TA 79-59, Dr. Thomas H. Hughes, D.M.D., Hillsboro, Ohio,
R. Patnode, and P. Pryor. Jun 80, 12p NIOSH-HE/TA-79-59

Area and personal air samples were taken on November 14 and 15, 1979 at the offices (SIC-8021) of a dentist in Hillsboro, Ohio to determine possible adverse health effects from exposure to nitrous oxide (10024972) and mercury (7439976). Personal breathing zone samples were taken on two dentists and two dental assistants. Operating room personnel were exposed to nitrous oxide concentrations that ranged from 115 to approximately 2,600 parts per million (ppm) per administration, with 75 percent of the samples falling within the 100 to 500ppm range. Area nitrous oxide samples for the receptionist ranged from 54 to 198ppm. Personnel were exposed to a maximum of 0.036 milligrams per cubic meter (mg/cu m) mercury vapor. The authors conclude that personnel are over exposed to nitrous oxide based on the current NIOSH recommended standard of 50ppm per administration and that exposure to mercury vapor is below the NIOSH recommended standard of 0.05mg/cu m. They recommend that a scavenging system be installed to exhaust the nitrous oxide gas and reduce personnel exposure.

6K. Life Support

AD-A089 305/7 PC **A02**/MF **A01**
Naval Weapons Handling Center Colts Neck NJ
Development and Testing of Packaging for Commercial Shipment of Survival Support Device,
Frank Ciccolella. 15 Aug 80, 15p Rept no. NWHC-8053

The Survival Support Device (SSD) is a vessel containing compressed air with a clear plastic hood and a regulating valve. The device is intended to facilitate breathing by personnel while evacuating a smoke or fume filled compartment aboard ship. Based on the relatively high internal pressure of the compressed air, restriction was placed on the commercial shipment of the SSD's by the Department of Transportation. The Naval Weapons Handling Center (NWHC) was tasked to develop a suitable shipping configuration for these devices which would minimize potential hazards to personnel and objects in the event of a failure. In conjunction with the Naval Explosive Ordnance Disposal Facility (NAVEODFAC), Naval Ordnance Station, Indian Head, Maryland, a means of failure simulation was devised. Concurrently, a packaging design was initiated at NWHC based on the predicted failure mode. On 1 April 1980 tests of fully pressurized SSD's were conducted at NAVEODFAC. Based on successful test results, NAVSEASYSCOM issued a Certification Control Number permitting commercial shipments of the SSD. (Author)

N80-32101/1 PC **A13**/MF **A01**
Lockheed Missiles and Space Co., Sunnyvale, CA. Biotechnology, Research and Development Div.
Development of a Preprototype Vapor Compression Distillation Water Recovery Subsystem.
Final Report.
K. L. Johnson. Nov 78, 289p NASA-CR-160779, LMSC-D626041
Contract NAS9-15136

The activities involved in the design, development, and test of a preprototype vapor compression distillation water recovery subsystem are described. This subsystem, part of a larger regenerative life support evaluation system, is designed to recover usable water from urine, urinal rinse water, and concentrated shower and laundry brine collected from three space vehicle crewmen for a period of 180 days without resupply. Details of preliminary design and testing as well as component developments are included. Trade studies, considerations leading to concept selections, problems encountered, and test data are also presented. The rework of existing hardware, subsystem development including computer programs, assembly verification, and comprehensive baseline test results are discussed.

6L. Medical and Hospital Equipment

PATENT-4 222 126 Not available NTIS
Department of Health, Education, and Welfare, Washington, DC.
Unitized Three Leaflet Heart Valve.
Patent,
John W. Boretos, and Norio Iriguchi. Filed 14 Dec 78, patented 16 Sep 80, 8p PB81-105983, PAT-APPL-969 571
Supersedes PB-294 587.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention describes a polyurethane heart valve having a semirigid frame composed of a base-ring and three struts, and an elastomeric membrane integral and unitary with the frame, the contours of which make up three leaflets of the valve. The leading edges of the leaflets which form the commissure line are reinforced with a narrow elastomer band. The leaflets are further reinforced by radiating lines projected from the frame into the leaflet and which simulate collagen formation in natural leaflets. In addition, the transition between the frame and the leaflets is tapered.

PB81-106601 PC **A10**/MF **A01**
Avco Everett Research Lab., Inc., Everett, MA.
Development and Evaluation of a Seamless Left Heart Assist Blood Pump.
Annual rept. 1 Jan 79-29 Feb 80,
P. Singh, D. Lederman, R. Cumming, F. Levine, and R. Morgan. Mar 80, 207p NIH-N01-HV-7-2937-2
Contract N01-HV-7-2937

A valved blood pump made from a single continuous elastomer (Avocothane 51 or Avcomat 610) has been developed. The pump weighs 65 g, has a 110 cc stroke volume, and 69% volumetric efficiency. It is fabricated with no steps or seams anywhere between the apical inflow and aortic outflow. The pump incorporates sinus-contoured trileaflet valves integral to the inflow and outflow conduits (18.5 mm dia, 14 mm Hg pressure gradient at 30 L/min). In vitro a flow of 10 L/min with 75% pump efficiency at 90 BPM has been achieved. In vivo experiments, in calves have demonstrated its effectiveness for circulatory support of the left ventricle during continuous assist for up to 45 days, (elective termination of health animal) without anticoagulant or antiplatelet therapies. These experiments have confirmed the importance of surface smoothness and high shear rates in minimizing thrombosis. The valves have functioned in vivo for up to 11 months. In vitro the pump has been fatigued in real time to 30.5 million cycles, and valves to 54 million cycles. (Ninety-seven million cycles at accelerated rates).

PB81-800153 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cyanoacrylate Tissue Adhesives. 1964-September, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Sep 80,
Elizabeth A. Harrison. Oct 80, 64p
Supersedes PB80-800048, and NTIS/PS-78/1023.

The selected abstracts are related to cyanoacrylate tissue adhesives. Topics covered include applications, properties, and synthesis of the materials. (This updated bibliography contains 59 citations, 2 of which are new entries to the previous edition.)

6M. Microbiology:

AD-A089 357/8 Not available NTIS
Naval Biosciences Lab Oakland CA
Infection of Mice by Aerosols of Klebsiella pneumoniae under Hyperbaric Conditions,
Robert J. Heckly, Mark A. Chatigny, and Robert L. Dimmick. 1980, 5p
Availability: Pub. in Applied and Environmental Microbiology, v40 n1 p80-83 Jul 80 (No copies furnished by DTIC/NTIS).

No abstract available.

PB81-111122 PC **A06**/MF **A01**
Florida Univ., Gainesville.
Studies of Methanogenic Bacteria in Sludge.
Final rept. Sep 66-Oct 79,
P. H. Smith. Aug 80, 115p EPA-600/2-80-093
Grant EPA-17070-DJV

Methanogenic bacteria were isolated from mesophilic anaerobic digesters. The isolates were able to utilize H2 and CO2 acetate, formate and methanol, but were not able to metabolize propionate and butyrate. It was shown the propionate and butyrate are not substrates for methanogenic bacteria but are converted to hydrogen, carbon dioxide and acetate by a hydrogenic microflora. The reactions leading to methane were quantitatively analyzed. It was shown that acetate, propionate and butyrate metabolism were inhibited by hydrogen. The formation of acetate and propionate were shown to be rate limiting in the digestion process, and that sludge digestion was not inhibited by hydrogen under conditions of excess substrate.

6P. Physiology

AD-A089 176/2 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge
Animal Preparations to Assess Neurophysiological Effects of Bio-Dynamic Environments.
Progress rept.,
Alan Hein. 17 Jul 80, 22p
Contract N00014-80-C-0094, Grant PHS-EY-02621

Sponsored in part by contract NGR-22-009-826.

Veridical perception of the visual world and motor performance which respects the location of objects in space is essential to survival. Mechanisms of some complexity support the development and maintenance of the capacity for perceptual-motor coordination. The evolution of these mechanisms has been accomplished in a terrestrial environment. Thus, it is not surprising that their operation is imperfect in specialized environments as are encountered in high performance aircraft. The altered gravitational-inertial forces encountered in such environments may disturb equilibrium, degrade motor performance and generate visual and postural illusions. Spatially-directed behaviors depend on two broad categories of accomplishments: to locate objects through one or more perceptual channels and the ability to monitor one's own position in space. The outcome is the ability to move toward targets either with the whole body or with a part such as head or limb. The visual and vestibular systems as sources of information about the location of objects in space are the primary concern of this report.

AD-A089 607/6 PC **A03**/MF **A01**
Duke Univ Eye Center Durham NC
Visual Acuity and the Balance between Receptor Density and Ganglion Cell Receptive Field Overlap.
Final rept.,
Myron L. Wolbarsht, and James Ringo. Jul 80, 45p
Contract N00019-79-C-0370

Visual acuity has been analyzed in terms of the responses of the retinal ganglion cells to different stimuli within their receptive field. The analysis includes not only the relation of the response to the receptor matrix, but also to the neural processing within the retina. A discussion is given of the different methods of analyzing the receptive fields: sensitivity profiles and Ricco field (area x intensity) plots, and displacement sensitivity (the response to a small stimulus plot switched between two positions just touching each other). The difficulties with each of these methods of analyzing the receptive field are illustrated with experimental data. The experimental data also indicates that the blue cone system may not contribute to visual acuity, possibly due to the neural organization of the receptive field. rather than to the small number of blue receptors. The present data indicates that in the cat area central is the average ganglion cell receptive field size is so large that through overlap, each retinal locus must be connected to at least 15 receptive field centers. (Author)

FRNC-TH-795 PC **A05**/MF **A01**
Nancy-1 Univ. (France).
Contribution to Research on the Isotopic Exploration of the Lacrimal Ducts.
M. Vauthier. 1976, 92p
In French.Thesis.
U.S. Sales Only.

With the help of radioactive tracers the physiological exploration of tear flow is now possible without instrumental manipulation. The use of sodium pertechnetate (sup(99m)TcO sub 4 -Na exp +) in physiological serum solution gives a good account of the natural role of tears in the drainage system and the dynamics of this latter. A solution of radioactive sodium pertechnetate in artificial tears (9/000 solution of sodium chloride) contains very little dissolved element compared with the amount of sodium chloride present. The specific activity of the pertechnetate in saline solution varies according to the examinations between 7 and 10mCi/cm exp 3 , which means that each calibrated 15 mu l drop has an activity of 105 to 150 mu Ci. The radiation dose delivered to the crystalline lens of both eyes (4mrad) is less than 2% that of an anteroposterior skull X-ray. The aim of this study is actually threefold: - in vivo demonstration of the normal internal configuration of tear ducts; - determination of the physiological lacrimal function of exccretion by qualitative and quantitative lacrimal scintigraphy, and of drainage dynamics norms; - study of tear absorption by the mucous membranes of the drainage ducts. The results show that the scintigraphic examination, while giving a mere approach to the internal morphology of the tear ducts, provides important information on their drainage dynamics. (Atomindex citation 11:517745)

N80-32066/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Restoration of Physical Performance Capacity of Athletes after Prolonged Restriction of Their Motor Activity.
A. D. Soldatov, and V. I. Finogeyev. Aug 80, 12p NASA-TM-76305
Contract NASW-3198
Transl. Into English from Teor. Prakt. Fiziol. Kult. (USSR), No. 5, May 1979 p 19-22. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By All-Union Scientific Research Inst. Of Physical Culture.

The effects of different regimens of treatment following prolonged hypokinesia were studied in order to determine the most effective program. The types of programs considered were passive means, consisting of physical therapy; active means, consisting of athletic training; and a combined program. In the first stage of the experiment, the effects of a 10 day period of hypokinesia were studied. It was determined that the restoration programs must address the problems of: (1) increasing defense function and general tone of the body; (2) restore orthostatic stability; and (3) increase general endurance. In later stages, groups of athletes and nonathletes underwent 30 day periods of hypokinesia. Restoration was carefully monitored for groups treated with the various regimens. It was determined that the most effective treatment was a comprehensive program of passive and active therapy.

N80-32067/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Physical Exercises on a Bicycle-Ergometer and Running Track to Prevent Hypodynamia in Workers of Intellectual Labor.
V. V. Vasilyeva, Y. N. Korableva, and V. V. Trunin. Aug 80, 7p NASA-TM-76306
Contract NASW-3198
Transl. Into English from Teor. Prakt. Fiziol. Kult. (USSR), No. 10, Oct. 1979 p 34-36. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By p. F. Lesgaft State Order of Lenin and Order of the Red Banner Inst. Of Physical Culture.

A program of exercises was developed and tested, consisting of a 12 minute session on a variable load bicycle ergometer and a 10-11 min. run with brief stretching and resting sessions between. Physical performance capacity was measured before, during, and after the period of the experiment and physical exams conducted. After a 4 month test period involving 30 men, aged 25-35, the program was found to be successful in increasing physical performance capacity. The PWC170 increased an average of 22 percent and maximum oxygen consumption 14 percent. Arterial pressure dropped (120/75 to 114/68), vital capacity of lungs increased by 6 percent, strength of respiratory muscles by 8.8 percent, duration of respiratory delay by 18 percent. Duration of cardiac cycles increased, stress index decreased. Cardiac contraction rate 2 minutes after work on the ergometer decreased from 118 to 102 bt/min.

N80-32070/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Orthoclinostatic Test as One of the Methods for Evaluating the Human Functional State.
V. A. Doskin, L. D. Gissen, O. Z. Bomshteyn, E. N. Merkin, and S. B. Sarychev. Aug 80, 8p NASA-TM-76321
Contract NASW-3198
Transl. Into English from Gig. Sanit. (USSR), No. 4, Apr. 1979 p 41-44. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By All-Union Scientific Research Inst. Of Physical Culture, Moscow.

The possible use of different methods to evaluate the autonomic regulation in hygienic studies were examined. The simplest and most objective tests were selected. It is shown that the use of the optimized standards not only makes it possible to detect earlier unfavorables shifts, but also permits a quantitative characterization of the degree of impairment in the state of the organism. Precise interpretation of the observed shifts is possible. Results indicate that the standards can serve as one of the criteria for evaluating the state and can be widely used in hygienic practice.

N80-32071/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Blood Filling and Flow in Lungs During Change in Body Position in Space.
A. S. Pogodin, and B. I. Mazhbich. Aug 80, 12p NASA-TM-76333
Contract NASW-3198
Transl. Into English from Fiziol. Zh. SSSR. V. 66, No. 4, Apr. 1980 p 555-561. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By USSR Academy of Medical Sciences, Siberia.

In the horizontal position (supine and lateral), in the upright position (head up and head down) and during change of the cat body position in space, quantitative responses of regional blood volume and blood flow in the lungs (ml/100 cu cm) revealed presence of the gradient in the gravitation direction. Blood volume and blood flow of different lung portions changed qualitatively and quantitatively in different ways. These changes occurred only in the direction producing the equality of regional hydrostatical and hemodynamic loads in the lungs at either horizontal level.

N80-32075/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Technique of Electrical Stimulation of the Vestibular Analyzer under Clinical Conditions.
S. N. Khechinashvili, B. M. Zargaryan, and K. G. Karakozov. Aug 80, 8p NASA-TM-76347
Contract NASW-3198
Transl. Into English from Vestn. Otorino-Laringol. (USSR), No. 5, Sep. - Oct. 1978 p 74-77. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By Tbilisi Inst. Of Physician Advancement.

Vestibular reactions appear under the action of direct current (dc) on the labyrinth of man and animals. A decrease of the stimulation effect of dc on the extralabyrinthine nervous formations in the suggested method is achieved by the use of electric pulses with steep front and back parts, as well as by previous anesthetization of the skin in the electrode application area by means of novocain solution electrophoresis. For this purpose a pulse producer giving trapezoid pulses with smoothly changing fronts and duration was constructed. With the help of an interrupter it is possible to stop the current increase instantly, and stimulation is performed at the level of the pulse 'plateau'. To induce vestibular reactions under monopolar stimulation, it is necessary to apply the current twice as high as that with bipolar electrode position. The use of short pulses with steep front and back parts for electrode stimulation of the vestibular analyzer is considered to be inexpedient.

N80-32080/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Vestibular Reactions in Patients During Occlusion Form of Chorioependymitis.
E. A. Ladyzhenskaya, and B. K. Arifdzhanov. Aug 80, 10p NASA-TM-76356
Contract NASW-3198
Transl. Into English from Med. Zh. Uzb. (USSR), No. 11, Nov. 1979 p 16-19. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prepared by Order of the Red Banner of Labor Medical Inst., Tashkent.

A change in intracranial pressure during chorioependymitis is discussed. The inflammatory process in the choroid plexi and walls of the cerebral ventricles is described. The otoneurological method, not having any significant contraindications, can be employed repeatedly, quaranteeing control in dynamics over the course of the disease and effectiveness of treatment.

PAT-APPL-6-176 234 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.

Dietary Supplementation with Essential Metal Picolinates.
Patent Application,
Gary W. Evans. Filed 8 Aug 80, 13p PB81-101602
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The levels of essential metals in the mammalian system can be precisely controlled by administering these metals in the form of exogenously synthesized coordination complexes of picolinic acid. The assimilation of an adequate quantity of physiologically important heavy metals is essential to the health of both humans and animals. Failure of the body to ingest and absorb the necessary amounts of such metals can lead to improper functioning of the metabolic processes as well as to a variety of diseases and associated symptoms. For example, anemia is correlated with an iron deficiency. Inadequate amounts of zinc may lead to skin conditions, loss of taste, neuropsychiatric symptoms, and in some animals the development of congenital anomalies and even the suppression of growth.

6Q. Protective Equipment

N80-32098/9 PC **A03**/MF **A01**
Grumman Aerospace Corp., Bethpage, NY. Advanced Development Dept.
Project Fires. Volume 1: Program Overview and Summary, Phase 1B.
Final Report.
F. J. Abeles. May 80, 49p NASA-CR-161529
Contract NAS8-32329

Overall performance requirements and evaluation methods for firefighters protective equipment were established and published as the Protective Ensemble Performance Standards (PEPS). Current firefighters protective equipment was tested and evaluated against the PEPS requirements, and the preliminary design of a prototype protective ensemble was performed. In phase 1B, the design of the prototype ensemble was finalized. Prototype ensembles were fabricated and then subjected to a series of qualification tests which were based upon the PEPS requirements. Engineering drawings and purchase specifications were prepared for the new protective ensemble.

N80-32099/7 PC **A07**/MF **A01**
Grumman Aerospace Corp., Bethpage, NY. Advanced Development Dept.
Project Fires. Volume 4: Prototype Protective Ensemble Qualification Test Report, Phase 1B.
Final Report.
F. J. Abeles. May 80, 127p NASA-CR-161532
Contract NAS8-32329

The qualification testing of a prototype firefighter's protective ensemble is documented. Included are descriptions of the design requirements, the testing methods, and the test apparatus. The tests include measurements of individual subsystem characteristics in areas relating to both physical testing, such as heat, flame, impact penetration and human factors testing, such as dexterity, grip, and mobility. Also, measurements related to both physical and human factors testing of the complete ensemble, such as water protection, metabolic expenditures, and compatibility are considered.

N80-32100/3 PC **A07**/MF **A01**
Grumman Aerospace Corp., Bethpage, NY. Advanced Development Dept.
Project Fires. Volume 3: Protective Ensemble Design and Procurement Specification, Phase 1B.
Final Report.
F. J. Abeles. May 80, 133p NASA-CR-161531
Contract NAS8-32329

Each of the subsystems comprising the protective ensemble for firefighters is described. These include: (1) the garment system which includes turnout gear, helmets, faceshields, coats, pants, gloves, and boots; (2) the self-contained breathing system; (3) the lighting system; and (4) the communication system. The design selection rationale is discussed and the drawings used to fabricate the prototype ensemble are provided. The specifications presented were developed using the requirements and test method of the protective ensemble standard. Approximate retail prices are listed.

6R. Radiobiology

AD-A089 354/5 PC **A02**/MF **A01**
School of Aerospace Medicine Brooks AFB TX
Thresholds and Mechanisms of Retinal Damage from a White-Light Laser.
Final rept. Oct 78-May 79,
Ronald D. Reed, John Taboada, and Gary A. Griess. 6 Sep 79, 8p Rept no. SAM-TR-79-379
Pub. in Health Physics, v39 p33-39 Jul 80.

No abstract available.

AD-A089 409/7 PC **A04**/MF **A01**
Institute for Defense Analyses Arlington VA
A Formula for Comparing Annual Damaging Ultraviolet (DUV) Radiation Doses at Tropical and Mid-Latitude Sites.
Final rept.,
Pythagoras Cutchis. Jun 80, 60p IDA-P-1492, FAA/EE-80-21
Contract DOT-FA77WA-3065

A simple formula is developed in this paper for the relative annual damaging ultraviolet radiation (DUV) dose at different tropical and mid-latitude sites. The formula consists of six multiplicative factors which include the effects of amount of ozone, latitude, altitude, cloudiness, ground albedo, and amount of aerosols. A seasonal ozone variation factor is introduced to modify the tropical relative DUV formula for application to mid-latitude sites. The approach involves correlations of sometimes sparse data, and remains to be validated in the general sense. The formula should be useful, where more exact data are not available, in studies of the effects of solar ultraviolet radiation--and its possible increase from a reduction in stratospheric ozone--on land and marine ecological systems and skin cancer incidence in white Caucasian populations. (Author)

FRNC-TH-746 PC **A06**/MF **A01**
Toulouse-3 Univ. (France).
Contribution to Clinical Dosimetry of Californium 252 Sources Used at Gustave Roussy Institute.
A. Mahmoudi. 1977, 114p
In French.Thesis.
U.S. Sales Only.

The main characteristics of californium 252 sources are presented in the first part of the report. Dose measurements around Californium sources were performed with a pair of ionization multiplication chambers: the first one has an Aluminium wall and is filled with Argon, the second one a plastic tissue-equivalent gas. A set of experiments was performed in order to investigate the relative influence of beta rays on the response of both chambers. Besides the experimental work a computer program was written to calculate the dose distribution around the actual sources made of a series of small active sources placed in catheters. Theoretical data around small sources can be found in the litterature. The comparison between experimental results and theoretical ones has shown a good agreement. The computer program will be included as a sub-routine in the more general computer program used for patients treated with interstitial therapy. (Atomindex citation 11:517802)

PATENT-4 213 045 Not available NTIS
Department of the Air Force Washington DC
Metal Nitride Oxide Semiconductor (MNOS) Dosimeter.
Patent,
Ronald G. Fraass, and Roger W. Tallon. Filed 29 Aug 78, patented 15 Jul 80, 7p AD-D007 437/7, PAT-APPL-937 909
Supersedes PAT-APPL-937 909-78, AD-D006 313.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a high radiation level dosimeter capable of measuring total ionizing radiation doses from gamma ray, X-ray, or E-beam sources by detecting charge variations in the gate structure of a metal nitride oxide semiconductor (MNOS) type transistor. The MNOS device displays a unique combination of characteristics allowing the storage, removal and measurement of the electrical charge trapped within its gate structure. The magnitude of the charge remaining is ascertained by measuring the threshold voltage necessary to produce a prescribed output current response, while the rate at which this charge decays is dependent on both the elapsed time and total ionizing radiation dose. Since the time and radiation dose effects on the charge are independent and cumulative, the device is capable of being subjected to high radiation doses without permanent effects, and the electrical performance of the device is repeatable to a high degree of accuracy, isolation and measurement of the total radiation dose is readily discernible from the MNOS response. After calibration the device is restored to its unradiated state and subjected to the ionizing radiation source of unknown level, while both the MNOS device response and the elapsed time are recorded. The total ionizing radiation dose administered by the source being measured is obtained by referring to the calibration results containing responses independently attributable to time and total ionizing radiation dose.

PB81-105769 PC **A05**/MF **A01**
Office of Radiation Programs, Washington, DC.
Cost-Risk Analysis of Protective Actions for a Low-Level Deposition of Radionuclides.
Contract rept. (Final),
S. Finn, V. Dura, and G. L. Simmons. May 80, 99p ORP/CR-80-1
Contract EPA-68-01-3549
Prepared by Science Applications, Inc., McLean, VA.

This report summarizes the results of a cost-effectiveness analysis of protective actions following a low-level deposition of radionuclides. The media contaminated were land, property, water supplies, persons, and biota. The end products of the investigation of such phase are dose and costs associated with dose reduction techniques. The mechanisms by which radionuclides may be taken up by humans were modelled, and control technologies (protective actions) which result in a reduction in the dose were defined. With the exception of Phase VI, the consequences were expressed as the 100-year collective dose commitment equivalent, in person-rem. In Phase VI, the dose calculated was the dose equivalent, also expressin in person-rem. The dose commitment is defined as the sum of all doses to individuals over the entire time period that radioactive material persists in the environment in a state available for interaction with humans. There are two time periods involved, (1) the intake period, during which radionuclides are taken up by humans, in this study taken to be 100 years, and (2) the time interval over which the dose rate is integrated, which was seventy years. The collective dose commitment is obtained by integrating the individual dose commitments over the affected population.

6S. Stress Physiology

AD-A089 448/5 Not available NTIS
Pennsylvania Univ Philadelphia Inst for Environmental Medicine
Prediction of Physiological Limits to Deep Diving and Extension of Physiological Tolerance,
C. J. Lambertsen. 1980, 12p
Grant N00014-80-G-0009
Availability: Pub. in Proceedings of Undersea Medical Workshop (23rd), p15-25, 19-21 Mar 80, Rept. no. UMS-PUB-40WS(DD), AD-A086 424 (No copies furnished by DTIC/NTIS).

No abstract available.

N80-32055/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Changes in Gas Exchange, Tissue Respiration and Glycolysis in Rats During Hypokinesia.
L. V. Zorya. May 80, 11p NASA-TM-76149
Contract NASW-3198
Transl. Into English from Fiziol. Zh. (USSR), V. 22, No. 3, 1976 p 414-417. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The results of an experiment which studied changes in oxygen balance under conditions of hypokinesia in rats is presented. The effect of the stress during hypokinesia is expressed most clearly in the changes of general gas exchange, and in the intensity of liver and myocardial tissue respiration.

N80-32059/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Absorption of Thiamine and Nicotinic Acid in the Rat Intestine During Fasting and Immobilization Stress.
O. G. Kirilyuk, and Y. V. Khmelevskiy. Jun 80, 11p NASA-TM-76193
Contract NASW-3199
Transl. Into English from Fiziol. Zh. (USSR), V. 23, No. 1, 1977 p 98-102. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Medical Inst., Kiev.

By perfusion of isolated sections of intestine with a solution containing thiamine at a concentration of 3.1 micromole, it was established that thiamine absorption in animals fasted for 72 hours decreased by 28 percent, whereas absorption increased by 12 percent in rats after 24 hour immobilization. After immobilization, absorption of label in the intestinal mucosa increased. Na K ATPase activity in the intestinal mucosa decreased by 10 percent during fasting, and it increased with immobilization of the animals. Activity of Na K ATPase in the intestinal mucosa cells determined the absorption rate of thiamine and nicotinic acid at the level of vitamin transport through the plasma membranes of the enterocytes.

N80-32060/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effects of Factors of Prolonged Space Flight on Conditions of Tortoise Skeleton.
G. P. Stupakon, A. I. Volozhin, V. A. Korzhenyants, V. S. Yagodovskiy, and A. N. Polyakov. Aug 80, 13p NASA-TM-76352
Contract NASW-3198
Transl. Into English from Patol. Fiziol. Eksp. Ter. (USSR), No. 6, Nov. - Dec. 1979 p 9-14. Transl. By Scientific Translation Service, Santa Barbara, Calif.

After a 60-90 day space flight mild osteoporosis developed in the epiphyses and metaphyses of long tubular bones of tortoises, which was not attributed to reduced mineral saturation of the preserved bone tissue microstructures. The diminished strength of the cancellous bone of the epiphyses in tortoises after space flight was due to the reduced properties of its structure. The strength of the compact substance did not change under the effect of weightlessness.

N80-32064/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Changes in Bone Tissue under Conditions of Hypokinesia and in Connection with Age.
E. P. Podrushnyak, and E. I. Suslov. Jun 80, 7p NASA-TM-76154
Contract NASW-3198
Transl. Into English from Fiziol. Zh. (USSR), V. 19, No. 6, Nov. - Dec. 1973 p 841-943. Transl. Was Announced as N80-21971. Transl. By Scientific Translation Service, Santa Barbara, Calif.

X-ray micrography was used to study the optical density of the blackening of X-ray photographs made of five bones in 9 young people (ages 24 to 29) before and after strict bed rest for 16 to 37 days. Photometric studies of the X-ray film determined the relative concentration of bone structure before and after hypokinesia. In addition, the bone tissues of 25 cadavers of practically healthy individuals (aged 18 to 70) who died from injuries were investigated using X-ray structural analysis. Results show that the reaction to the state of hypokinesia is not uniform in different individuals and is quite often directly reversed. It was established that pronounced osteoporosis can be found in a relatively short time after conditions of hypokinesia in healthy young individuals. Results show that the stabilization of the crystalline structure of hydroxyapatite, especially its crystal formation, is finished by the age of 20 to 25. From 25 to 60, the crystal lattice remains in stable condition but X-ray analysis shows a reduction in the hydroxyapatite density.

N80-32065/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effects of Hirudin-Induced Activation of Non-enzymatic Fibrinolysis During Immobilization Stress.
F. B. Shapiro, I. P. Baskova, L. U. Cherkesova, L. A. Lyapina, and M. D. Goldovskaya. Jul 80, 14p NASA-TM-76189
Contract NASW-3199
Transl. Into English from Fiziol. Zh. SSSR. V. 64, No. 11, Nov. 1978 p 1567-1574. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Moscow State Univ.

The specific inhibitor of thrombin, hirudin, was used for studying the mechanism of the activating effect of ACTH and adrenalin on nonenzymatic fibrinolytic activity (NEFA), the latter characterizing the function of the anticoagulation system (ACS). Simultaneous administration of ACTH and hirudin to animals subjected to immobilization stress did not reduce the effect of ACTH on NEFA, while simultaneous administration of adrenalin and hirudin revealed a diminished effect of the former. This suggests different mechanisms of ACTH and adrenalin effects upon NEFA: the stimulating effect of norepinephrine is realized through throminogenesis followed by activation of the ACS function and by increased NEFA and therefore inhibitable by hirudin which forms an inactive complex with thrombin. In fact the stimulating effect of ACTH upon NEFA is brought about specifically by another route than thrombinogenesis and thus occurs in the presence of hirudin. Hirudin itself has no effect upon NEFA.

N80-32068/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effect of Hypokinesia on Blood Microcirculation.
A. M. Chernukh, O. G. Gazenko, B. M. Fedorov, T. N. Krupina, and P. N. Aleksandrov. Aug 80, 9p NASA-TM-76308
Contract NASW-3198
Transl. Into English from Patol. Fiziol. Eksp. Ter. (USSR), No. 3, May - Jun. 1979 p 10-13. Transl. By Scientific Translation Service, Santa Barbara, Calif.

Blood microcirculation in the region of the scleral bulbar conjunctiva and the nail folds on the fingers and toes was studied in 18 practically healthy men during 182 day antiorthostatic hypokinesia and 30 day rehabilitation period. Marked changes in microcirculation in the sclera and feet and less evident changes on the hands was revealed. A complex of special prophylactic physical exercises had a distinctly favorable effect on circulation in the hands.

N80-32072/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Occupational Changes in the Organ of Hearing and Equilibrium in Sailors and Fisherman.
R. P. Menyakin, and V. I. Poperetskaya. Aug 80, 9p NASA-TM-76335
Contract NASW-3198
Transl. Into English from Vestn. Otorino-Laringol. (USSR), No. 1, Jan - Feb. 1980 p 39-42. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By Vladivostok Medical Inst.

Prophylactic examination in persons engaged in fishing industry and in sailors of ocean-going ships demonstrated occupational cochlear neuritis, resulting from the action of noise and vibration. Five hundred and fifty three sailors and fishermen working under conditions of noise were studied. A total of 233 persons 43.7% were found to be suffering from changes of the auditory analyzer typically resulting from the action of noise and vibration. The most pronounced changes of hearing were revealed in fishermen, in 44.8% of the persons examined, the percentage also being the highest among the engine room workers (63%). The incidence of cochlear neuritis in sailors of the ocean-going steamship line and in personnel of research ocean-going ships was almost equal (39.9-40%). These indices differed in the engine room workers (42-46%). Vestibular function was investigated by caloric and rotation tests with the use of electronystagmography. The data obtained point to diminution of the vestibular analyzer excitability with increase of the length of navigation service.

N80-32077/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Physiological Reactions of a Passenger to Transportation Conditions.
A. M. Lakshin, and V. P. Novoselov. Aug 80, 8p NASA-TM-76350
Contract NASW-3198
Transl. Into English from Gig. Sanit. (USSR), No. 9, Sep. 1979 p 84-85. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By USSR Ministry of Communication, Moscow.

The effect of transportation conditions on the performance capacity of a passenger were studied, in order to establish the time for his most rapid inclusion in production activity after the trip. It was concluded that the transportation conditions impair the functional condition of the passenger's organism. The restoration of the functional state to the initial level occurs mainly in the space of one day. It is shown that it is necessary to take into consideration the adaptation of the organism during transfer to another climate zone.

N80-32079/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Use of Physical Culture to Increase Resistance of Sailors to Motion Sickness.
I. V. Salanin. Aug 80, 8p NASA-TM-76355
Contract NASW-3198
Transl. Into English from Teor. Prakt. Fiz. Kult. (USSR), No. 11, Nov. 1979 p 35-37. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prepared by Moscow State Inst. Of Physical Culture.

From 50% to 70% of sailors are exposed to motion sickness in storms. A program of physical exercises is described and tested for effectiveness in preventing this problem. In comparing the results of tests of susceptibility to motion sickness given to groups before and after a program of exercises and to a control group, it is found that physical education can strengthen the vestibulary apparatus and help prevent motion sickness.

6T. Toxicology

AD-A089 426/1 PC **A02**/MF **A01**
Letterman Army Inst of Research San Francisco CA
Hematologic and Selected Hepatic Changes Produced by Substituted p-Bensoquinones in the Rat.
Technical note,
S. T. Omaye, R. A. Wirtz, L. S. Guthertz, P. C. Taylor, and J. T. Fruin. Jul 80, 11p Rept no. LAIR-TN-14

Rats were given daily oral doses of 2-methyl-1,4-benzoquinone (MBQ) or 2-ethyl-1,4-benzoquinone (EBQ) at the LD sub 05 level for four days. There were 5.6 to 14.8% decreases of blood heme parameters in rats treated with substituted p-benzoquinone compared to agar-treated controls. Benzoquinone treatment resulted in 67% increases of blood leukocyte counts. Hepatic microsomal cytochrome P-450 and cytochrome b sub 5 contents were decreased 11.9 to 26.5% in benzoquinone-

treated rats. Aniline hydroxylase activity decreased 25.7 to 42.7%. There was no change in liver weight, microsomal protein, nonprotein sulfhydryls, or GSH-s-Transferase activity. The results of this study suggest that substituted p-benzoquinones may have exerted their toxic action in rats by altering heme metabolism. (Author)

AD-A089 527/6 PC **A02**/MF **A01**
Air Force Aerospace Medical Research Lab Wright-Patterson AFB OH
Toxicity of Synthetic High Density and Conventional Hydrocarbon Jet Fuels to a Soil Bacterium.
Technical rept. Sep 78-Sep 79,
Sheldon A. London, and Charlie R. Mantel. Aug 80, 22p Rept no. AFAMRL-TR-80-105

The effects of selected high density and conventional jet fuels on the growth kinetics of a soil microorganism were determined. A culture of Enterobacter clocacae isolated from soil was exposed to various concentrations of each fuel in a mineral salts medium and bacterial growth was monitored turbidimetrically and by viable count techniques. Effects were indicated by observing changes in maximum bacterial growth, growth rate, lag time, and death rate. The majority of the fuels studied manifested their effects by decreasing the number of viable organisms during the stationary growth period. Stable emulsion formation resulted in erroneous turbidimetric determinations. The applicability of bacterial systems as indicators of toxicity of water insoluble jet propellants was discussed. (Author)

PB81-105249 PC **A05**/MF **A01**
Maryland Univ., College Park. Water Resources Research Center.
Chalk Point Cooling Tower Project Native Vegetation Study.
Final rept. 1979,
G. W. Patterson, R. A. Galloway, B. A. Francis, and T. L. Lauver. Jun 79, 78p SR-15, PPSP/CPCTP-34
See also report dated Jun 78, PB-289 163.

The Potomac Electric Power Company generating station at Chalk Point, MD, utilizes brackish water in its natural draft cooling tower and, consequently, releases saline aerosol into the atmosphere. A research and monitoring project was established in 1974 to evaluate the effects of this drift on native perennial vegetation. Leaf samples have been collected form dogwood, Cornys florida, Virginia pine, Pinus virginiana, black locust, Robinia pseudoacacia, and sassafras, Sassafras albidum, located at 12 different sites in the vicinity of the power plant. Sampling was begun prior to the operation of the cooling tower, 1974, and continued through 1978. Complete results from monthly monitoring of foliar chloride in the four native tree species is documented for May through September 1978. Results from salt spray experiments indicate chloride and sodium concentrations in the wood of dogwood trees increases with increased spraying levels.

PB81-105728 PC **A07**/MF **A01**
Raltech Scientific Services, Inc., Madison, WI.
Adriamycin Cardiotoxicity: A Comparison with Adriamycin (NSC No. 268242).
Final rept. 17 Oct 78-17 Jul 79,
Gary A. Splitter, Joseph J. Laich, Susana R. K. de Dennis, Warren H. Dennis, and James A. Will. 15 Nov 79, 131p RSS/268242/1979/14
Contract N01-CM-4-3746
Prepared in cooperation with Wisconsin Univ.-Madison.

Adriamycin analog NSC No. 268242 was much less toxic than its parent compound. This conclusion is based on histologic, hematologic, serum enzyme, electrocardiographic and clinical chemistry studies. Analog treated rabbits had few changes in hematologic or clinical chemistry parameters which failed to uncover any evidence of drug toxicity. The ECG's of all analog treated rabbits were within normal limits. Male rabbits treated with NSC No. 268242 had normal testicular weights. Histopathological findings indicate that NSC No. 268242 caused no damage to the heart and kidneys. NSC No. 268242 appears to be cardiotoxic compared to Adriamycin and less toxic in general considering the total cumulative dose, increased life span, weight gain and other clinical and biochemical signs of toxicity.

PB81-105876 PC **A06**/MF **A01**
Raltech Scientific Services, Inc., Madison, WI.
Adriamycin Cardiotoxicity: A Comparison with 4-Demethoxyadriamycin Hydrochloride NSC No. 256438.
Final rept. 12 Dec 78-13 Sep 79,
Gary A. Splitter, Joseph J. Lalich, Susana R. K. de Dennis, Warren H. Dennis, and James A. Will. 10 Jan 80, 122p 43746-16, RSS-256438-1979-16
Contract N01-CM-4-3746
Prepared in cooperation with Wisconsin Univ.-Madison.

Adriamycin analog NSC 256438, at the dose levels utilized, was not cardiotoxic compared to its parent compound, Adriamycin. The analog and its parent compound were evaluated by histologic, hematologic, serum enzyme, clinical chemistry and electrocardiographic parameters. The analog did not alter the survival time of the animals, postinjection weight gains or concentrations of selected serum components when compared with controls. Except for mild renal changes in one rabbit and moderate bone marrow hypoplasia in another rabbit, histologic examination of selected tissues was similar to control rabbits. In contrast to analog NSC 256438, Adriamycin produced marked renal and cardiac toxicosis, decreased animal survival time and markedly altered several hematological and enzyme parameters.

PB81-105884 PC **A07**/MF **A01**
Raltech Scientific Services, Inc., Madison, WI.
Adriamycin Cardiotoxicity: A Comparison with 4'EPI-Adriamycin NSC No. 256942.
Final rept. 28 Nov 78-13 Sep 79,
Gary A. Splitter, Joseph J. Lalich, Susana R. K. de Dennis, Warren H. Dennis, and James A. Will. 7 Jan 80, 127p 43746-15, RSS-256942-1980-15
Contract N01-CM-4-3746
Prepared in cooperation with Wisconsin Univ.-Madison.

Adriamycin analog NSC 256942 failed to induce the clinical signs of toxicosis compared to its parent compound. Administration of NSC 256942 for only twelve weeks produced cardiac fibrosis and myofiber atrophy which was observed histologically in all five treated animals. Renal alterations in these treated animals consisted of protein casts, epithelial vacuoles and institial fibrosis in three of five animals. Transudate formation was observed only in four rabbits treated with the analog beyond twelve weeks. Those animals treated beyond twelve weeks failed to survive to the length of the study with all animals having cardiac fibrosis and severe renal lesions and three out of six having hepatic chronic passive congestion. While NSC 256942 exerted less systemic intoxication than ADR, nevertheless this analog was still a potent cardiotoxic anthracycline drug by the test protocol utilized.

PB81-106650 PC **A08**/MF **A01**
Raltech Scientific Services, Inc., Madison, WI.
Rabbit Response to the Administration of Different Doses of Adriamycin.
Final rept. 15 Feb 78-12 Jun 79,
Gary A. Splitter, Joseph J. Lalich, Susana R. K. de Dennis, Warren H. Dennis, and James A. Will. 15 Nov 79, 155p RSS-123127/1979/13, 43746-13
Contract N01-CM-43746
Prepared in cooperation with Wisconsin Univ.-Madison.

Adriamycin (NSC No. 123127), administered at 0.5, 1.0 or 1.5 mg/kg of body weight/week for twelve weeks, induced pathologic changes that increased with the dose. Weight loss was evident in rabbits receiving 0.5 mg/kg of body weight/week, but clinical signs, bio-chemical changes and microscopic examination of the heart, kidneys and bone marrows were similar to control animals. Rabbits receiving 1.0 mg/kg of body weight/week had a decreased survival, significant weight loss, biochemical alterations and chronic microscopic changes in the heart and kidneys. Rabbits treated with 1.5 mg/kg of body weight/week had the shortest survival of all grooups tested, with prominent weight loss and moderate to severe cellular deterioration in the myocardium and kidneys. Increasing ADR dose beyond 0.5 mg/kg of body weight/week produces marked renal and cardiac toxicosis, decreased animal survival time and markedly alters several hematological and enzyme parameters.

PB81-109449 PC **A03**/MF **A01**
Environmental Protection Agency, Arlington, VA. Special Pesticide Review Div.
Captan: Position Document 1.
22 Jul 80, 44p EPA/SPRD-80/104

The report is a preliminary risk assessment for captan. It gives a preliminary examination of its use, environmental residues, and health effects including toxicology data. Limited information is provided for exposure and extent of risk. Results of a literature search are provided.

PB81-109456 PC **A04**/MF **A01**
Environmental Protection Agency, Arlington, VA. Special Pesticide Review Div.
Ethylene Dibromide: Position Document 1.
14 Dec 77, 71p EPA/SPRD-80/73

The report is a preliminary risk assessment for ethylene dibromide. It gives a preliminary examination of its use, environmental residues, and health effects including toxicology data. Limited information is provided for exposure and extent of risk. Results of a literature search are provided.

PB81-109464 PC **A04**/MF **A01**
Environmental Protection Agency, Arlington, VA. Special Pesticide Review Div.
Pentachlorophenol: Position Document 1.
18 Oct 78, 70p EPA/SPRD-80/85

The report is a preliminary risk assessment for pentachlorophenol. It gives a preliminary examination of its use, environmental residues, and health effects including toxicology data. Limited information is provided for exposure and extent of risk. Results of a literature search are provided.

PB81-109472 PC **A03**/MF **A01**
Environmental Protection Agency, Arlington, VA. Special Pesticide Review Div.
Pronamide: Position Document 1.
1 Apr 77, 31p EPA/SPRD-80/67
See also report dated 15 Jan 79, PB80-213911.

The report is a preliminary risk assessment for kerb 50W. It gives a preliminary examination of its use, environmental residues, and health effects including toxicology data. Limited information is provided for exposure and extent of risk. Results of a literature search are provided.

PB81-109480 PC **A05**/MF **A01**
Environmental Protection Agency, Arlington, VA. Special Pesticide Review Div.
Endrin: Position Document 4.
3 May 79, 82p EPA/SPRD-80/39

The report is a preliminary risk assessment for endrin. It gives a preliminary examination of its use, environmental residues, and health effects including toxicology data. Limited information is provided for exposure and extent of risk. Results of a literature search are provided.

PB81-110421 PC **A07**/MF **A01**
Raltech Scientific Services, Inc., Madison, WI.
Adriamycin Cardiotoxicity: A Comparison with m-AMSA (NSC No. 249992),
J. Will, G. Splitter, J. Lalich, S. Dennis, and W. Dennis. 30 Jan 80, 129p RSS-249992-1979-17, 43706-17
Contract N01-CM-4-3746

NSC No. 249992 (m-AMSA), at the dose level utilized, was not cardiotoxic compared to ADR. NSC No. 249992 and ADR were evaluated by histologic, hematologic, serum enzyme, clinical chemistry and electrocardiographic parameters. NSC No. 249992 did not alter the animal's survival time postinjection, weight gains or concentrations in selected serum components when compared with controls. Histologic examination of selected tissues was similar to control rabbits. In contrast to NSC No. 249992, Adriamycin produced marked renal and cardiac toxicosis, decreased animal survival time and markedly altered several hematological and enzyme parameters.

PB81-110884 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Development of Recommended Test Method for Toxicological Assessment of Inhaled Combustion Products.
Final rept.,
Merritt M. Birky, Maya Paabo, Barbara C. Levin, Susan E. Womble, and Dolores Malek. Sep 80, 56p NBSIR-80-2077

The objective of the project supported by PRC was to develop a test method for measuring the toxicity of combustion products from polymeric materials including cellular plastics. The development of such a test procedure was considered an essential first step to determine the hazard to life when cellular plastics are involved in fire. As result of this work, a test procedure was developed. It consists of 3 major elements; (1) combustion system, (2) chemical analysis system and (3) animal exposure system. Two biological endpoints obtained from the exposure are: (1) incapacitation in 30 minute exposure period, and (2) lethality in 30 minutes plus 14 days post exposure. The test apparatus has been evaluated to determine mixing rates and loss of reactive chemicals in the exposure chamber. In addition, a statistical evaluation of the experimental results demonstrated that order of incapacitation was independent of animal location. Evaluation of a limited number of different materials that produce different toxicological syndromes has demonstrated the utility of all 3 endpoints. Two natural polymers (wood and wool) and 2 synthetic materials (modacrylic and PTFE) have been studied in detail. In addition, preliminary data have been obtained on a flexible polyurethane foam (CM-21).

PB81-111320 PC **A07**/MF **A01**
Raltech Scientific Services, Inc., Madison, WI.
Adriamycin Cardiotoxicity: A Comparison with Adriamycin Analog NSC No. 287513.
Final rept. 7 Nov 77-19 Jul 78,
Gary A. Splitter, Joseph J. Lalich, Susana R. K. de Dennis, Warren H. Dennis, and James A. Will. 7 Jan 79, 134p 43746-07, RSS-287513-1979-07
Contract N01-CM-4-3746
Prepared in cooperation with Wisconsin Univ.-Madison.

Adriamycin analog NSC 287513 was not as cardiotoxic as its parent compound when injected for a twelve week period. Four of six analog treated rabbits survived the length of the experiment and all of the rabbits gained weight, but not as much weight as the controls. Severe renal toxicity and cardiomyopathy were noted in one rabbit. However, when NSC 287513 was administered longer than twelve weeks, an analog cardiomyopathy was present in five of six rabbits and renal toxicosis affected three of six rabbits. Striking transudate formation was also noted as well as a consistent hypoalbuminemia. Parameters evaluated were histologic, serum enzyme, blood chemistry and electrocardiographic findings.

7. CHEMISTRY

7A. Chemical Engineering

N80-31874/4 PC **A04**/MF **A01**
AeroChem Research Labs., Inc., Princeton, NJ.
Silicon Halide-Alkali Metal Flames as a Source of Solar Grade Silicon.
Final Report.
D. B. Olson, W. J. Miller, and R. K. Gould. Jan 80, 75p NASA-CR-163514, AEROCHEM-TP-395
Contract JPL-954777
Sponsored in Part by DOE.

The feasibility of using continuous high-temperature reactions of alkali metals and silicon halides to produce silicon in large quantities and of suitable purity for use in the production of photovoltaic solar cells was demonstrated. Low pressure experiments were performed demonstrating the production of free silicon and providing experience with the construction of reactant vapor generators. Further experiments at higher reagent flow rates were performed in a low temperature flow tube configuration with co-axial injection of reagents and relatively pure silicon was produced. A high temperature graphite flow tube was built and continuous separation of Si from NaCl was demonstrated. A larger scaled well stirred reactor was built. Experiments were performed to investigate the compatability of graphite based reactor materials of construction with sodium. At 1100 to 1200 K none of these materials were found to be suitable. At 1700 K the graphites performed well with little damage except to coatings of pyrolytic graphite and silicon carbide which were damaged.

PB81-100208 PC **A07**/MF **A01**
McKee (Davy) Corp., Cleveland, OH.
Fuel Alcohol: Report and Analysis of Plant Conversion Potential to Fuel Alcohol Production.
Sep 80, 130p NAFC/80-07
Contract NAFC-T-16076552

An analysis is made of the national potential to convert and/or to retrofit existing plants to process their present feedstock into fuel alcohol in lieu of their originally designed final product. Categories of plants examined are distilleries, breweries, corn wet milling, beet and cane sugar mills, wineries, cheese whey, and other food processing. Outline descriptions are developed for a base-case plant in each of the industries found to be a viable contributor to a fuel alcohol program. These base-case plants are illustrative of plant size, estimated capital costs of conversion, operating costs, labor estimates for daily operation, and estimated time schedules for comparison purposes. The facilities described as convertible could begin making alcohol by 1982, with a total of 581 million gallons of ethanol identified by 1985 and an additional 300 million gallons being possible. Thus with current production, these additional volumes can largely meet the President's 1982 ethanol goal, and can contribute greatly to the 1985 goal. A glossary is included.

PB81-800013 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sulfur Dioxide Control. 1976-July, 1980 (Citations from the American Petroleum Institute Data Base).
Rept. for 1976-Jul 80,
Diane M. Cavagnaro. Oct 80, 266p
Supersedes NTIS/PS-79/0678, and NTIS/PS-78/0655.

This bibliography contains citations on the different aspects of air pollution control of sulfur dioxide by industry. Covered are control processes, techniques, equipments, design, and performance. (This updated bibliography contains 260 citations, 50 of which are new entries to the previous edition.)

PB81-800161 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nitrogen Oxide Air Pollution: Control Technology. 1978-August, 1980 (Citations from the NTIS Data Base).
Rept. for 1978-Aug 80,
Diane M. Cavagnaro. Oct 80, 264p
Supersedes NTIS/PS-79/1057, and NTIS/PS-78/0971. Updates NTIS/PS-74/089. See also 1969-1974, NTIS/PS-76/0844 and 1975-1977, NTIS/PS-79/1056.

Nitrogen oxide air pollution control is considered from both mobile and stationary sources. Fluidized bed combustion, boiler combustion modification, and engine design are discussed, as they relate to emissions reduction. (This updated bibliography contains citations, 76 of which are new entries to the previous edition.)

7C. Organic Chemistry

AD-A089 338/8 PC **A03**/MF **A01**
Oklahoma Univ Norman Dept of Chemistry
Synthesis of Tetraphenylstannacyclopentadienes (Stannoles). II. Derivatives and Adducts of 1,1-Dihalo-2,3,4,5-tetraphenylstannoles,
W. A. Gustavson, L. M. Principe, W.-Z. Min Rhee, and J. J. Zuckerman. 15 Sep 80, 42p
Contract N00014-77-C-0432, Grant NSF-CHE78-26548
See also AD-A089 128.

1,1-Dibromo- and 1,1-diiodo-2,3,4,5-tetraphenyl-1-stannacyclopentadiene, dihalotetraphenylstannoles, XYSnC4(C6H5)4, can be derivatized to form a series of disubstituted products in which X=Y=N3, iso-NCO, iso-SCN, OC(O)CH3, SC(S)N(C2H5), N(CH3)2 and P(C6H5)2. Fluorination by KF in acetone results in the X=F, Y=Br or Y=I product only, and lithioamination by LiN(Si(CH3)3)2 yields the X=N(Si(CH3)2, Y=Br product only. Attempted synthesis of the dihalostannoles by halogenation of the intermediate tin(II) stannole from 1,4-dilithio-1,2,3,4-tetraphenyl-1 3-butadiene and tin(II) chloride yields only the ring-opened products (4-bromo-1,2,3,4-tetraphenylbutadienyl) tin tribromide or (4-iodo-1,2,3,4-tetraphenylbutadienyl)tin triiodide. Even gentle chlorination of hexaphenylstannole by elemental chlorine cleaves the ring tin-carbon bonds to form cis-cis-1,4-dichloro-1,2,3,4-tetraphenylbutadiene-1,3 and diephenyltin dichloride, while the action of a glacial acetic acid/acetic anhydride mixture yields tetraphenylfuran and diphenyltin diacetate. The dihalostannoles form neutral adducts with pyridine, 2,2'-bipyridyl and 1,10-phenanthroline, and the double salt (XSnC4(C6H5)4 terpy) + (X2YSnC4(C6H5)4) from 2,2',2 in.-terpyridine where X=Y=Br, I=F, Y=I. The structures of the substituted stannoles and the adducts of the dihalostannoles are discussed on the basis of tin-119m Mossbauer and infrared spectroscopic evidence. (Author)

7D. Physical Chemistry

AD-A089 156/4 PC **A03**/MF **A01**
Northwestern Univ Evanston IL Dept of Chemistry
Image Field Theory of Enhanced Raman Scattering by Molecules Absorbed on Metal Surfaces: Detailed Comparison with Experimental Results.
Technical rept.,
George C. Schatz, and Richard P. Van Duyne. 15 Sep 80, 32p Rept no. TR-1
Contract N00014-79-C-0794

An image field theory of surface enhanced Raman spectroscopy is used to study the dependence of Raman intensities on light frequency, nature of adsorbate and metal, electrode potential, scattering angle and light polarization. Although the image field enhancement (IFE) theory is at best a crude approximation to the true enhancement mechanism, it does find quite reasonable agreement between the IFE predictions and most existing experimental results.

AD-A089 157/2 PC **A02**/MF **A01**
Northwestern Univ Evanston IL Dept of Chemistry
Tunable Laser Excitation Profile of Surface Enhanced Raman Scattering from Pyridine Adsorbed on a Copper Electrode Surface.
Technical rept.,
Craig S. Allen, George C. Schatz, and Richard P. Van Duyne. 15 Sep 80, 16p
Contract N00014-79-C-0794

The wavelength dependence of Surface Enhanced Raman Scattering from pyridine on a copper electrode has been measured and found to correlate closely with the optical properties of copper metal. The results are interpreted in the light of the image field model of the SERS mechanism. Data are presented which indicate that the observed time decay of the 1037 /cm mode in the Ag case and the weakness of the 1037 /cm mode on Cu may have a common origin. (Author)

AD-A089 203/4 PC **A03**/MF **A01**
SRI International Menlo Park CA
Energy Transfer Reactions of Excited Atoms and Molecules.
Final rept. 16 May 77-15 May 80,
Tom G. Slanger. 28 Jul 80, 35p SRI-MP-80-87, ARO-14708.4-C
Contract DAAG29-77-C-0018

Five main areas have been investigated: (1) observations of the three metastable states of O2 with excitation energies between 4 and 5 eV have been made in afterglow systems, (2) a new energy transfer process has been discovered in the NO molecule; (3) using the H2 laser, direct observations were made of o(1D) radiation at 6300 A from O2 photodissociation; (4) the product channels for the quenching of O(1S) by O(3P) have been investigated; and (5) quenching of O(1S) by the species in an oxygen-helium afterglow gives convincing evidence that the most important quenching molecule is O2, with a rate coefficient of approximately gas kinetic collision frequency.

AD-A089 215/8 PC **A04**/MF **A01**
Wisconsin Univ-Madison Dept of Chemistry
Luminescent Properties of Semiconductor Photoelectrodes.
Technical rept.,
Arthur B. Ellis, and Bradley R. Karas. 12 Aug 80, 51p Rept no. TR-1
Contract N00014-78-C-0633

The use of luminescent, n-type 5-1000-ppm CdS:Te and 10 ppm-CdS:Ag polycrystalline photoelectrodes as probes of recombination in photoelectrochemical cells is reported. Except for intensity, the emission spectra (lambda sub max, 600-700 nm) are insensitive to the presence of S2-/Sn2- electrolyte and to the excitation wavelengths and electrode potentials employed. With ultraband gap irradiation (lambda less than or = 500 nm) and aqueous S2-/Sn2- or Te2-/(Te2)2- electrolytes, optical energy is converted to electricity at 0.1-5% efficiency and to luminescence at 0.01-1.0% efficiency; the effects of surface preparation and grain boundaries in determining efficiency and discussed. Increasingly negative bias applied to CdS:Te and CdS:Ag photoanodes increases emission intensity by 15-100% while the photocurrent simultaneously declines to zero. Band gap edge 514.5-nm excitation yields smaller photocurrents and larger but much less potential dependent emission intensity. These results are consistent with the band bending model presently used to described photoelectrochemical phenomena. (Author)

AD-A089 219/0 PC **A02**/MF **A01**
Pittsburgh Univ PA
Laboratory Studies of Atomic Collision Processes.
Final rept. 1 Jan 77-30 Jun 80,
Manfred A. Biondi. 27 Aug 80, 3p ARO-14656.9-P
Grant DAAG29-77-G-0079

The various electron removal and ion-molecule reactions investigated experimentally under the ARO grant are enumerated. Reports containing the detailed scientific progress of these studies are cited. In addition, a list of the journal articles describing the results of the experimental investigations, together with appropriate citations, is given. (Author)

AD-A089 229/9 PC **A02**/MF **A01**
National Bureau of Standards Washington DC Surface Science Div
Interaction of Hydrogen, Carbon Monoxide, and Methanol with Ni(100).
Technical rept.,
D. Wayne Goodman, John T. Yates, Jr., and Theodore E. Madey. 20 Sep 79, 11p Rept no. TR-21
Contract N00014-80-F-0008
Pub. in Surface Science, v93 pL135-L142 1980.

No abstract available.

AD-A089 246/3 PC **A02**/MF **A01**
Catholic Univ of America Washington DC Dept of Physics
Spinodal Decomposition in Binary Mixture of Strongly Anisotropic Molecules.
Technical rept.,
Paul H. E. Meijer, and Erik Bodegom. Aug 80, 16p Rept no. TR-2
Contract N00014-78-C-0518

We determine the phase separation and the spinodal of binary liquids with anisotropic interaction between the molecules. The results show the influence of the anisotropy parameters on the position of the spinodal curve. The model is interpreted as a decorated lattice transformation of the Bethe-Peierls solution. (Author)

AD-A089 247/1 PC **A03**/MF **A01**
Catholic Univ of America Washington DC Dept of Physics
A New Approach to Kinetics of Spinodal Decomposition in the Linear Regime.
Technical rept.,
Y. M. Wong, and Paul H. E. Meijer. 28 Aug 80, 32p Rept no. TR-3
Contract N00014-78-C-0518
Errata sheet inserted.

We generalized the unified approach of Metiu, Kitahara and Ross and are able to make new predictions about the early stage of the unstable fluctuation. (Author)

AD-A089 267/9 PC **A02**/MF **A01**
Naval Research Lab Washington DC
High-Power Picosecond Photolysis of Simple Organic Molecular Gases,
B. B. Craig, W. L. Faust, L. S. Goldberg, J. M. Schnur, and P. E. Schoen. 11 Sep 80, 14p

High-power picosecond UV pulses from a Nd:YAG mode-locked laser were used to induce a visible emission from a variety of gaseous organic molecules. We report the observation of electronically excited C2, CH, CN and H fragments. The spectral characteristics and time development of the emitting species are highly dependent upon the structure of the parent molecules. (Author)

AD-A089 268/7 Not available NTIS
Naval Research Lab Washington DC
Application of Advanced Optical Spectroscopic Methods to Energetic Materials.
L. S. Goldberg, J. M. Schnur, P. E. Schoen, W. L. Faust, and T. R. Royt. Dec 79, 8p
Availability: Pub. in Proceedings of JANNAF Combustion Meeting (16th) held at Naval Postgraduate School, Monterey, CA 10-14 Sep 79. p31-38 Dec 79 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A089 387/5 PC **A03**/MF **A01**
Michigan State Univ East Lansing Dept of Chemistry
Solvent Isotope Effects Upon the Kinetics of some Simple Electrode Reactions.
Technical rept.,
Michael J. Weaver, Paul D. Tyma, and Scott M. Nettles. 15 Aug 80, 40p Rept no. TR-1
Contract N00014-79-C-0670

The effect of replacing H2O with D2O solvent upon the electrochemical kinetics of simple transition-metal redox couples containing aquo, ammine, or ethylenediamine ligands have been investigated at mercury electrodes as a means of exploring the possible contribution of ligand-aqueous solvent interactions to the activation barrier to outer-sphere electron transfer. Comparison of isotope rate ratios for corresponding electrochemical and homogeneous outer-sphere reactions involving cationic ammine and aquo complexes yields values of isotopic rate ratios of hydrogen and deuterium for the former processes that are typically markedly larger than those predicted by the Marcus model from the homogeneous rate ratios. These discrepancies appear to arise from differences in the solvent environments in the transition states for electrochemical and homogeneous reactions.

AD-A089 388/3 PC **A02**/MF **A01**
Michigan State Univ East Lansing Dept of Chemistry
On the Deficiencies of the Ferricinium-Ferrocene Redox Couple for Estimating Transfer Energies of Single Ions.
Technical rept.,
Saeed Sahami, and Michael J. Weaver. 15 Aug 80, 17p Rept no. TR-2
Contract N00014-79-C-0670

The difference between the partial molal entropies of ferrocene and ferricinium has been determined in nine solvents from the temperature dependence of the formal potential of the ferricinium-ferrocene redox couple using a nonisothermal electrochemical cell arrangement in order to probe possible structural reasons for the limitations of the 'ferrocene assumption' for estimating the transfer thermodynamics of single ions between different solvents. In contrast to the uniformly small positive values of partial molal entropies of ferrocene and ferricinium predicted by the Born model, the experimental quantities varied widely from small or even negative values in hydrogen-bonded solvents (-5 to 3 e.u.) to substantially larger values (11-14 e.u.) in dipolar aprotic media. These variations appear to arise chiefly from additional solvent ordering in the vicinity of the ferricinium cation compared to the ferrocene molecule which is enhanced in the aprotic solvents. The variations in partial molal entropies of ferrocene and ferricinium between water and a number of nonaqueous solvents provide a predominate contribution to the differences between the free energies of single ion transfer calculated using the ferrocene and alternative extrathermodynamic assumptions.

AD-A089 405/5 PC **A03**/MF **A01**
Aerospace Corp El Segundo CA Vehicle Engineering Div
An Irreversible Thermodynamics Model for Graphite Sublimation in Intense Radiation Environments.
Final rept.,
R. L. Baker. 15 Sep 80, 37p TR-0080(5909-20)-1, SD-TR-80-62
Contract F04701-79-C-0080

A model for the phase change behavior of graphite when exposed to a high external radiation heat flux has been developed in order to examine solid-gas nonequilibrium effects. The usual Knudsen-Langmuir type model is extended to one which allows both pressure and temperature discontinuities at the ablating surface. Calculated results indicate a relatively constant effective heat of ablation. However, major uncertainties are shown to remain regarding individual carbon species concentrations and the input energy required for melting. A unique feature of the irreversible thermodynamics model is the prediction of gas phase supersaturation when JANNAF thermochemical data is utilized. (Author)

AD-A089 423/8 PC **A03**/MF **A01**
Aerospace Corp El Segundo CA Aerophysics Lab
Temperature Dependence of Vibrational Relaxation from the Upper Vibrational Levels of HF and DF.
Interim rept.,
Roger L. Wilkins, and Munson A. Kwok. 29 Aug 80, 41p TR-0080(5603)-1, SD-TR-80-63
Contract F04701-79-C-0080

Room temperature quenching rate coefficients for relaxation from the upper vibrational levels of HF and DF have been successfully duplicated with good agreement with available experimental data. This agreement was obtained with the use of a rotational nonequilibrium model and rate coefficients computed by Wilkins. The key processes are V to R and R to V mechanisms, which give the problem a multiple-channel nature. The model provided temperature-dependent quenching rate coefficients for relaxation of HF(v) and DF(v) by HF(v = 0) and DF(v = 0). The temperature dependence is predicted to be similar to that measured for HF(v = 1) + HF and its isotopic analogs. The results of this study indicate that HF(v) + HF(v = 0), DF(v) + DF(v = 0), DF(v) + HF(v = 0), HF(v) + DF(v = 0) all scale as v to the nth power with n varying between 2.3 and 1.6 as v increases from 2 to 6. With the appropriate fine structure rate coefficients, this model should be equally applicable to vibrational relaxations from the upper vibrational levels of other hydrogen-halide molecules. This theoretical study is the first in which the temperature dependence of the V to R rate coefficients for HF(v sub 1) + HF(v sub 2 = 0) and its isotopic analogs have been predicted over the entire temperature range from 300 to 2400 K.

AD-A089 442/8 PC **A04**/MF **A01**
Arnold Engineering Development Center Arnold Air Force Station TN
Summary Report for the CONSET Program at AEDC.
Final rept. Jul 73-Dec 79,
W. D. Williams, and J. W. L. Lewis. Sep 80, 62p Rept no. AEDC-TR-80-16
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

An experimental study of the condensation of gases in expansion flow fields was conducted under the auspices of the AFRPL CONSET Program. Pure gas expansions, as well as binary and ternary gas mixture expansions and the plume of a monopropellant hydrazine thruster were studied. Laser-Rayleigh and laser-Raman scattering, mass spectrometric sampling, and electron beam fluorescence were used as nonperturbing flow diagnostics. This report summarizes results of these experiments.

AD-A089 454/3 PC **A03**/MF **A01**
George Washington Univ Washington DC Dept of Chemistry
Auger Lineshapes of Solid Surfaces - Atomic, Bandlike or Something Else.
Technical rept.,
Brett I. Dunlap, Fred L. Hutson, and David E. Ramaker. Aug 80, 26p Rept no. TR-4
Contracts N00014-78-C-0496, N00014-80-K-0852

A simple model is presented to predict the level of localization (i.e., localization onto an atomic, bonding lobe, molecular, or band orbital) of the two and three hole final states in Auger lineshapes. In the spirit of the Hubbard model, the extent of localization is predicted from the one- and two-center Coulomb interaction potentials and the relevant valence bandwidths. Results from the model are compared with experiment for the N KVV lineshapes from NaNO3, and the S and Si L23 VV lineshapes from Li2SO4 and SiO2. These lineshapes exhibit a wide range of localization consistent with the model. (Author)

AD-A089 463/4 PC **A02**/MF **A01**
Battelle Columbus Labs OH
The Potential Energy Curve for the X(1)Sigma(g)+State of Mg(2) Calculated with Coupled Pair Many Electron Theory,
George D. Purvis, III, and Rodney J. Bartlett. 30 Jun 79, 4p AFOSR-TR-80-0765
Grant AFOSR-78-3661
Pub. in Jnl of Chemical Physics, v71 n1 p548-550 1 Jul 79.

No abstract available.

AD-A089 464/2 PC **A02**/MF **A01**
Battelle Columbus Labs OH
The Electronic Structure of the Formyl Radical HCO,
George F. Adams, Gary D. Bent, George D. Purvis, and Rodney J. Bartlett. 22 Jun 79, 7p AFOSR-TR-80-0764
Grant AFOSR-78-3661
Pub. in Jnl. of Chemical Physics, v71 n9 p3697-3702 1 Nov 79.

No abstract available.

AD-A089 465/9 PC **A02**/MF **A01**
Battelle Columbus Labs OH
Accurate Binding Energies of Diborane, Borane Carbonyl, and Borazane Determined by Many-Body Perturbation Theory,
Lynn T. Redmon, George D. Purvis, III, and Rodney J. Bartlett. 15 Nov 78, 9p AFOSR-TR-80-0771
Grant AFOSR-78-3661
Pub. in Jnl. of the American Chemical Society, v101 n11 p2856-2862 23 May 79.

No abstract available.

AD-A089 466/7 PC **A02**/MF **A01**
Battelle Columbus Labs OH
The Quartic Force Field of H(2)O Determined by Many-Body Methods that Include Quadruple Excitation Effects,
Rodney J. Bartlett, Isaiah Shavitt, and George D. Purvis, III. 1 Mar 79, 12p AFOSR-TR-80-0770
Grant AFOSR-78-3661
Pub. in Jnl. of Chemical Physics, v71 n1 p281-291 1 Jul 79.

No abstract available.

AD-A089 469/1 PC **A02**/MF **A01**
Cornell Univ Ithaca NY Dept of Chemistry
The Photochemistry of Nitrosyl Halides: The X+NOX yields X2+NO(v) Reaction (X=Cl, Br),
A. J. Grimley, and P. L. Houston. 23 Aug 79, 7p AFOSR-TR-80-0822
Grant AFOSR-78-3513
Pub. in Jnl. of Chemical Physics, v72 n3 p1471-1475 1 Feb 80.

No abstract available.

AD-A089 475/8 PC **A02**/MF **A01**
Hawaii Univ Honolulu Dept of Physics and Astronomy
Low Energy X-Ray Emission Spectra and Molecular Orbital Analysis of CH(4), CCL(4), and CHCL(3),
Rupert C. C. Perera, and Burton L. Henke. 11 Jan 79, 11p AFOSR-TR-80-0766
Grant AFOSR-79-0027
Pub. in Jnl. of Chemical Physics, v70 n12 p5398-5406 15 Jun 79.

No abstract available.

AD-A089 476/6 PC **A02**/MF **A01**
Illinois Univ At Urbana-Champaign Electro-Physics Lab
Stimulated Hyper-Raman Scattering in a Molecular Gas via a Three-Photon Process to Obtain IR and Far IR Radiation,
David Kyung J. Kim, and Paul D. Coleman. 25 Jun 79, 10p AFOSR-TR-80-0774
Grant AFOSR-76-2988
Pub. in IEEE Jnl. of Quantum Electronics, vQE-16 n3 p300-307 Mar 80.

No abstract available.

AD-A089 478/2 PC **A02**/MF **A01**
New Mexico Univ Albuquerque Dept of Physics and Astronomy
A New Functional Form for Representing Vibrational Eigenenergies of Diatomic Molecules. II. Application to H(2) Ground State,
Ali-Reza Hashemi-Attar, and Charles L. Beckel. 26 Jul 79, 7p AFOSR-TR-80-0769
Grant AFOSR-77-3132
Pub. in Jnl. of Chemical Physics, v71 n11 p4596-4600 1 Dec 79. See also AD-A072 290.

No abstract available.

AD-A089 479/0 PC **A02**/MF **A01**
Rochester Univ NY Dept of Chemistry
Na + Xe Collisions in the Presence of Two Nonresonant Lasers,
Paul L. DeVries, C. H. Chang, Thomas F. George, Bernard Laskowski, and James R. Stallcop. 9 Dec 79, 3p AFOSR-TR-80-0824
Contracts F49620-78-C-0005, W-7405-ENG-48
Pub. in Chemical Physics Letters, v69 n3 p417-418 1 Feb 80. Sponsored in part by Grant NSF-CHE77-27826 and NASA-NSG-2198.

No abstract available.

AD-A089 503/7 PC **A02**/MF **A01**
Northwestern Univ Evanston IL Materials Research Center
Electronic Structure of 1T-VSe(2),
Alex Zunger, and A. J. Freeman. 12 Jul 78, 8p AFOSR-TR-80-0767
Grants AFOSR-76-2948, NSF-DMR76-80847
Pub. in Physical Review B, v19 n12 p6001-6009, 15 Jun 79. Prepared in cooperation with Argonne National Lab., IL.

No abstract available.

AD-A089 514/4 PC **A02**/MF **A01**
George Washington Univ Washington DC Dept of Chemistry
Symmetry Properties of Spin-Polarized LEED.
Technical rept.,
Brett I. Dunlap. 9 Apr 80, 10p Rept no. TR-3
Contracts N00014-78-C-0496, N00014-80-K-0852
Pub. in Solid State Communications, v35 n2 p141-144 1980.

No abstract available.

AD-A089 548/2 PC **A02**/MF **A01**
University of Southern California Los Angeles Dept of Chemistry
Mechanism of the Reactions of Dimethylsilylene with Oxetanes,
Tai-Yin Yang Gu, and William P. Weber. 23 Jul 79, 5p AFOSR-TR-80-0840
Grant AFOSR-77-3123
Pub. in Jnl. of the American Chemical Society, v102 n5 p1641-1644, 27 Feb 80.

No abstract available.

AD-A089 551/6 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Chemistry
The Reaction of the Trimethyl-chlorosilane/Magnesium Reagent with gem-Dibromocyclopropanes,
Dietmar Seyferth, and Don P. Duncan. 28 Aug 79, 9p AFOSR-TR-80-0825
Grant AFOSR-79-0007
Pub. in Jnl. of Organometallic Chemistry, v187 p1-8 1980.

No abstract available.

AD-A089 552/4 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Chemistry
Formation of Vinylidenecarbene Intermediates in Multiple Infrared Photon Elimination Reactions,
C. Reiser, and J. I. Steinfeld. 30 Aug 79, 3p AFOSR-TR-80-0836
Grant AFOSR-78-3725, Contract DOE-EY-76-S-02-2793
Pub. in Jnl. of Physical Chemistry, v84 n6 p680-681 1980.

No abstract available.

AD-A089 553/2 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Chemistry
Distribution of HX Vibrational States in Four-Center Elimination Reactions: A Surprisal Analysis and Synthesis,
E. Zamir, and R. D. Levine. 30 Aug 79, 7p AFOSR-TR-80-0837
Grant AFOSR-77-3135
Pub. in Chemical Physica Letters, v67 n2, 3 p237-242, 15 Nov 79.

No abstract available.

AD-A089 554/0 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Chemistry
Tetramethylcyclopropyl-lithium: Stability in Diethyl Ether and Reactions with Trimethylchlorosilane and Trimethyltin Chloride,
Dietmar Seyferth, and Doron D. Dagani. 9 Oct 79, 10p AFOSR-TR-80-0838
Grant AFOSR-79-0007
Pub. in Synthesis and Reactivity in Inorganic and Metalorganic Chemistry. v10 n2 p137-145 1980.

No abstract available.

AD-A089 555/7 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Chemistry
Analysis of Perturbations in the A Doublet Pi-X Doublet Sigma(+) 'Red' System of CN,
Anthony J. Kotlar, Robert W. Field, Jeffrey I. Steinfeld, and John A. Coxon. 8 Feb 79, 25p AFOSR-TR-80-0835
Grants AFOSR-78-3725, AFOSR-75-2758
Pub. in Jnl. of Molecular Spectroscopy, v80 p86-108 1980.

No abstract available.

AD-A089 583/9 PC **A02**/MF **A01**
Rochester Univ NY Dept of Chemistry
Multiphoton-Multiphonon Theory of Laser-Stimulated Surface Processes.
Technical rept.,

Jui-teng Lin, A. C. Beri, Michael Hutchinson, William C. Murphy, and Thomas F. George. Aug 80, 21p Rept no. TR-4
Contract N00014-80-C-0472

A theoretical model for multiphoton laser-excitation and multiphonon (t1) and phase (T2) relaxation of molecules adsorbed on a solid surface is developed. The ensemble-averaged excitation number for the infrared-active adspecies is obtained within a Heisenberg-Markovian approximation. The selective nonthermal excitation is sensitive to the mass ratio of the surface atoms and the adspecies, the order of the multiphonon excitation and the duration of the laser pulse. (Author)

AD-A089 584/7 PC **A02**/MF **A01**
Rochester Univ NY Dept of Chemistry
Laser Interaction with the End Atoms of a Linear Chain.
Technical rept.,
William C. Murphy, and Thomas F. George. Aug 80, 16p Rept no. TR-5
Contract N00014-80-C-0472

The effects of laser radiation on a one-dimensional linear system are examined using classical mechanics. Laser-induced desorption of oxygen from silicon and hydrogen from lead are studied in detail. (Author)

AD-A089 590/4 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Propagating Waves and Target Patterns in Chemical Systems.
Technical summary rept.,
Paul C. Fife, and John Tyson. May 80, 24p Rept no. MRC-TSR-2074
Contracts DAAG29-80-C-0041, DAAG29-75-C-0024

A class of models for target patterns (concentric circular waves emanating from a point called the leading center) is constructed in the context of singularly perturbed reaction-diffusion systems of partial differential equations. First, the theory of wave fronts is detailed for scalar equations and systems of equations. A scaling method reduces complex waves to the consideration of a group of simple wave phenomena. It is shown that expanding wave fronts can be generated spontaneously at a point. This process, together with the laws of their subsequent motion, reduces the problem to an ordinary differential initial value problem, whose solution is required to have certain properties. A discussion is given of the connection between these results and experimental observations. (Author)

AD-A089 608/4 PC **A05**/MF **A01**
Aerospace Corp El Segundo CA Chemistry and Physics Lab
Expected Detection Limits of Hydrazine-Based Rocket Fuels and Their Selected Oxidation Products by 12C16O2 Laser Spectroscopic Techniques.
Interim technical rept.,
G. L. Loper, A. R. Calloway, M. A. Stamps, and J. A. Gelbwachs. 15 Aug 80, 78p TR-0080(5970-09)-1, SD-TR-80-55
Contract F04701-79-C-0080

This report details the progress of the effort toward the development of CO2 laser spectroscopic techniques for the detection of trace airborne levels of toxic hydrazine-based rocket fuels and some of their potentially toxic air oxidation products. The health hazards to humans resulting from exposure to these compounds, even at very low concentrations, are of increasingly great concern. The Air Force needs improved detection techniques that will permit these compounds to be monitored on a real-time basis down to the 30 part-per-billion (ppb) level in the ambient air near hydrazine-fuel production and storage facilities and at missile launch sites. (Author)

AD-A089 626/6 PC **A03**/MF **A01**
Miami Univ Oxford OH Dept of Chemistry
Compositional, Atomic and Molecular Analysis in Support of Materials Needs of the U.S. Air Force.
Final technical rept. 12 May 77-10 Feb 80,
J. E. Katon. May 80, 26p AFWAL-TR-80-4064
Contract F33615-77-C-5058

Work performed during the period May 1977-February 1980 in support of various Air Force programs is summarized. The work covers method development, support programs, service functions, materials characterization and development and application of analytical chemical techniques of various kinds. In addition, research in the areas of molecular structure determination and materials characterization was performed. (Author)

AD-A089 659/7 PC **A02**/MF **A01**
Rochester Univ NY Dept of Chemistry
Dynamical Model of Selective Versus Nonselective Laser-Stimulated Surface Processes.
Technical rept.,
Jui-teng Lin, and Thomas F. George. 17 Apr 80, 14p Rept no. TR-1
Contracts N00014-80-C-0472, F49620-78-C-0005
Pub. in Surface Science, v100 7p 1980.

No abstract available.

AD-A089 660/5 PC **A02**/MF **A01**
Rochester Univ NY Dept of Chemistry
Effect of Surface Magnetic Fields on Laser-Induced Predissociation of Diatomic Molecules.
Technical rept.,
Dilip K. Bhattacharyya, Kai-Shue Lam, and Thomas F. George. 12 May 80, 8p Rept no. TR-2
Contract N00014-80-C-0472
Pub. in Jnl. of Chemical Physics, v73 2p, 15 Aug 80.

No abstract available.

AD-A089 669/6 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
On the Question of the Existence and Nature of Homogeneous-Center Target Patterns in the Belousov-Zhabotinskii Reagent.
Technical summary rept.,
Paul C. Fife. Jul 80, 20p Rept no. MRC-TSR-2096
Contract DAAG29-80-C-0041, Grant NSF-MCS79-04443

This continues previous work by Tyson and the author on the application of multiple-scaling techniques to the modeling and analysis of the expanding concentric rings of chemical activity seen in the Belousov-Zhabotinskii reagent. The model is based on 'Oregonator' kinetics. Previous work with these kinetics concentrated on heterogeneous-center patterns, induced by an external particle or other stimulus; this explores the possibility of homogeneous center structures, more controversial but reportedly observed. (Author)

ATSF-CL-77-11 PC **A03**/MF **A01**
Association Technique de la Siderurgie Francaise, Paris.
Using Nuclear Methods for Analyzing Materials and Determining Concentration Gradients.
R. Darras. 31p CONF-7610174-1
In French.Meeting of the Commission of the French Siderurgy Technical Association, Paris, France, 26 Oct 1976.
U.S. Sales Only.

After reviewing the various types of nuclear chemical analysis methods, the possibilities of analysis by activation and direct observation of nuclear reactions are specifically described. These methods make it possible to effect analyses of trace-elements or impurities, even as traces, in materials, with selectivity, accuracy and great sensitivity. This latter property makes them advantageous too for determining major elements in small quantities of available matter. Furthermore, they lend themselves to carrying out superficial analyses and the determination of concentration gradients, given the careful choice of the nature and energy of the incident particles. The paper is illustrated with typical examples of analyses on steels, pure iron, refractory metals, etc. (Atomindex citation 11:512886)

CEA-CONF-4711 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Protection.
Reactions of F-Element Ions in Aqueous Solution with Sulfur Donor Atom Ligands.
R. Fitoussi, and C. Musikas. 1979, 12p CONF-7905165-1
In French.Session on actinides, Karlsruhe, F.R. Germany, 31 May 1979.
U.S. Sales Only.

This study shows that the dialkyldithiophosphate complex UO sub 2 (DTP) exp + exists in aqueous solution. Complexes richer in ligand are observed in organic phases in contact with aqueous solutions. In the case of pentavalent ions the compound NpO sub 2 (DTP), xH sub 2 O precipitates if the alkyl radical is butyl, with ethyl or methyl radical no precipitation occurs. An effect produced by the length of the ligand organic chain is observed as in the case of the uranium VI complex. (Atomindex citation 11:521077)

CEA-CONF-4729 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France).
Nuclear Spin Dipolar Relaxation in Paramagnetic Systems Undergoing Multiple Internal Motions.
A. Tsutsumi, J. P. Quaegebeur, and C. Chachaty. 1979, 37p CONF-7906171-1
International symposium on mangnetic resonance in chemistry, biology and physics, Argonne, IL, USA, 27 Jun 1979.
U.S. Sales Only.

A theoretical treatment is proposed for the relaxation induced by the dipolar interaction between two spins separated by several bonds. The influence of the internal and overall molecular motions upon the carbon 13 longitudinal relaxation is discussed on the model of n-butylamine coordinated to a paramagnetic ion having a comparatively long electron spin relaxation time like Mn exp 2+ . A computer program has been made to analyze in terms of internal motions and transient conformations the exp 13 C longitudinal dipolar relaxation in flexible and partially rigid molecules. The calculations of exp 13 C relaxation rates have been also applied to the conformational study of less simple molecules undergoing several internal motions such as leucine and norleucine coordinated to Gd exp 3+ in aqueous solution. Numerical values are given on electron spin relaxation time and reorientation correlation time for these molecules: Mn, Ni, La, Gd, Dy amino-complexes and leucine and norleucine complexes. (Atomindex citation 11:521032)

CEA-CONF-4732 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Div. de Chimie.
Electrochemical Studies in Molten Sodium Fluoroborate.
M. Brigaudeau, and J. F. Wagner. 1979, 17p CONF-7906172-1
In French.Session on molten salts, Liege, Belgium, 6 Jun 1979.
U.S. Sales Only.

Physical properties of sodium fluoroborate are recalled and first results obtained during experimental study of molten NaBF sub 4 are exposed. The system Cu/CuF is used as an indicator of fluoride ion activity and dissociation constant of the solvent is determined by adding NaF to NaBF sub 4 saturated with BF sub 3 at a pressure of 1 atm and found equal to 2.7 x 10 exp -3 . (Atomindex citation 11:521516)

CEA-N-2090 PC **A08**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Recherche et Analyse.
Study of Some Electrochemical Properties of Uranium in a Molten Fluoride Medium. Application to the Determination of the U(IV)/U(III) Ratio in the Fuel of a Fused Salt Breeder Reactor.
P. Chardard. Oct 79, 157p
In French.
U.S. Sales Only.

The aim of this work is to check the possibility of determining the U(IV)/U(III) ratio by electrochemical techniques in the fused LiF-BeF sub 2 -ThF sub 4 mixture, solvent of a fused salt breeder reactor. The electrochemical properties of uranium sys-

tems were studied. The electrochemical reduction of U(IV) in LiF-BeF sub 2 -ThF sub 4 at 615 exp 0 C was studied by linear and cyclic potential variation voltamperometry, constant current voltamperometry and pulse voltamperometry (normal and derived mode). The results obtained at a molybdenum electrode show two successive electron transfers. The formation of U-Mo alloy is observed. The oxidation of U(IV) was observed at a vitreous carbon electrode. The results show that the uranium V formed is unstable, their interpretation suggesting that U(IV) dismutes into U(IV) and probably into gaseous UF sub 6 . In view of these results it was possible to determine the U(IV)/U(III) ratio by the use of the above electrochemical techniques. (Atomindex citation 11:521069)

CEA-R-5009 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Genie Radioactif.
Coacervation of Aqueous Solutions of Tetraalkylammonium Halides.
A. Mugnier de Trobriand. Sep 79, 18p
In French.Thesis.
U.S. Sales Only.

The coacervation of aqueous solutions of tatraalkylammonium halides in the presence of not of inorganic halides and acids has been studied, considering thermodynamic and spectroscopic aspects. The importance of dispersion forces as well as forces resulting from hydrophobic hydration has been assessed. The analogy between these systems and anionic ion exchange resins has been shown especially for Uranium VI extraction. (Atomindex citation 11:521209)

COO-2718-8 PC **A02**/MF **A01**
Missouri Univ.-St. Louis.
Observation of Luminescent Spectra in Low Energy Ion-Neutral Collisions. Progress Report, June 1, 1979-May 31, 1980.
J. J. Leventhal. Feb 80, 15p
Contract AS02-76ER02718

This report describes work performed during the past year. Apparatus was constructed for the purpose of studying laser-assisted charge transfer and work was begun on developing a novel method of measuring metal atom densities in the vapor phase. Modelling of energy transfer in molecular systems was continued and new results obtained. (ERA citation 05:034256)

CRN-CPR-79-09 PC **A02**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Scavenging of the Precursors of the Solvated Electrons from the Positron Lifetime Spectroscopy and the Doppler Broadening of Annihilation Line Shape Technique.
J. C. Abbe, G. Duplatre, A. G. Maddock, and A. Haessler. 1979, 17p
U.S. Sales Only.

The electron scavenging properties in water of two series of solutes are investigated, using the positron as a probe. For a better interpretation of the data, both the lifetime spectrosccpy and the Doppler broadening of annihilation line shape technique are used. All solutes inhibit the positronium (Ps) formation, by the scavenging of electron. The first series consists of the halate ions, that should follow the Hunt linear relation between the rate constant for reaction with the solvated electrons, ksub(e exp - sub(aq)+S) and that for its precursors(s), 1/C sub 37 . The Ps inhibition constants, k, are 0.14, 1.44, and 3.45M exp -1 for ClO sub 3- , BrO sub 3- and IO sub 3- , respectively. This sequence is quantitatively consistent with that of the respective ksub(e exp - sub(aq)+S). The second series includes the SeO sub 4-- , Te(OH) sub 6 and BrO sub 4- species, and the Ps inhibition constants are 5.62, 10.5 and 14.3, respectively. Theses values are much higher than expected from the ksub(e exp - sub(aq)+S) constants, on basis of the Hunt relation, in agreement with previous results from pulse radiolysis experiments. (Atomindex citation 11:521127)

FRNC-TH-853 PC **A07**/MF **A01**
Paris-6 Univ. (France).
Contribution to the Theoretical Study of Collisions Between Highly Excited Atom and a Neutral Particle (Atom or Molecule).
E. de Prunele. 1979, 126p
In French.Thesis.
U.S. Sales Only.

The problem of the collision between an atom in the Rydberg state and a neutral atom (or molecule) is considerably simplified if it is considered as the collision of a B particle with a system of two linked particles A exp + and e exp - . If the interaction between these two particles is described by a potential and if the three-body interaction is approximated by a potential equal to the sum of the two-body interaction potentials, the problem is theoretically solvable exactly within the framework of quantum mechanics, but its explicit solution is very complicated, even for very simple potentials. Various types of approaches are then necessary. The choice of interaction potentials is already an approximation, for it is obviously not known how to describe exactly the interaction between the electron and atom B for example. The fact that the electron is, on average, very far from core A exp + has enabled an interaction potential to be simulated between B and e exp - when the latter is linked to A exp + , by utilizing the scattering data between free e exp - and B. (Fermi's pseudopotential). A second approach consists in utilizing the scattering data between free e exp - and B, without bringing in an interaction potential between e exp - and B. The first approach is more satisfactory from the theoretical point of view; the second and less ambitious one is more useful. (Atomindex citation 11:511713)

FRNC-TH-862 PC **A06**/MF **A01**
Paris-6 Univ. (France).
Study at Thermal Energies of the Excitation Transfer of Potassium Atoms in the (4P/sub 1/2/) State in Collision with Helium Atoms.
M. Y. Perrin. 1979, 105p
In French.Thesis.
U.S. Sales Only.

The collision theory is established for fine structure changes in the first doublet of the alkali metal - rare gas couple: the adiabatic potential curves are calculated, the semi-classical and quantum treatments of collision are given and the influence of the interaction potential on the total cross-section is analyzed. The experimental device built to measure the total cross-sections of fine structure transition for the K*-He couple is described: rare gas jet system, alkali jet system, laser, optics, detection. The results obtained on the cross-section sigma(exp 4 P/sub 1/2/ implies exp 4 P/sub 3/2/) are given for the couple K*-He from 0.07 to 0.4 eV. (Atomindex citation 11:511709)

FRNC-TH-863 PC **A07**/MF **A01**
Paris-11 Univ., Orsay (France).
Non-Resonant Two- and Three-Photon Ionization of the Singlet and Triplet Metastable Helium Atoms of an Atomic Jet.
B. Mathieu. 1978, 142p
In French.Thesis.
U.S. Sales Only.

The three-photon ionization cross-section of the helium metastables He(2 exp 1 S) and He(2 exp 3 S) is determined by means of the linearly polarized radiation of a pulsed ruby laser with an emission wavelength equal to 6946.4 A at 19 exp 0 C. Two-photon ionization, obtained by doubling the laser beam frequency, is also studied. (Atomindex citation 11:511697)

INIS-mf-5533 PC **A04**/MF **A01**
Australian Inst. of Nuclear Science and Engineering, Lucas Heights.
7TH AINSE Nuclear Physics Conference, 1978. Abstracts of Papers.
1978, 73p CONF-780297-(Absts.)
AINSE nuclear physics conference, Melbourne, Australia, 6 Feb 1978.
U.S. Sales Only.

Papers from this conference were precessed individually for the TIC data base as they were received on ATOMINDEX tape. (Atomindex citation 11:511638)

NIIAR-16(375) PC **A03**/MF **A01**
Nauchno-Issledovatel'skii Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR).
X-Ray Diffraction Analysis of Composition and Crystal Structure of Some Pentavalent Actinide Carbonates.
Yu. F. Volkov, G. I. Visyashcheva, S. V. Tomilin, I. I. Kapshukov, and A. G. Rykov. 1979, 29p
In Russian.
U.S. Sales Only.

Carried out is x-ray investigation of the crystal structure of the compounds M sub 3 AnO sub 2 (COsub3) sub 2 xnH sub 2 O(1) and Msub(4)AnOsub(2)(COsub(3)) sub(2,5)xnHsub(2)O(2), where M = Na, K and Rb, An = Np(5), Pu(5) and Am(5). Determined is a general structural scheme of carbonate compounds of pentavalent actinides, in the basis of which is mutual substitution of actinide atoms and atoms of alkaline metals. It is shown, that the main structural elements of different carbonate compounds are anion layers of (Msub(x)(AnOsub(2))sub(1-x)COsub(3)) variable composition, where x can have the values from 0 to 1. It is shown, that as far as the structure is concerned, the compounds (1) and (2) are recorded in the form of Msub(2)(MAnOsub(2)(COsub(3)) sub (2))xnHsub(2)O(1) Msub(2)(Msub(1,2)(AnOsub(2)) sub (0.8) x (COsub(3)) sub(2)) xnHsub(2)O(2) and they are the edge members of the continuous line of Msub(2)(Msub(1+x)(AnOsub(2))sub(1-x)(COsub(3))sub(2))xnHsub(2)O compounds, where 0 < or approximately X < or approximately 0.2. On the basis of the obtained peculiarity of carbonate crystal structure considered is the possibility of corbonate compounds formation of different composition. (Atomindex citation 11:521121)

N80-31473/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Chemical Research Projects Office: An Overview and Bibliography, 1975-1980.
D. A. Kourtides, A. H. Heimbuch, and J. A. Parker. Aug 80, 36p NASA-TM-81227, A-8317

The activities of the Chemical Research Projects Office at Ames Research Center, Moffett Field, California are reported. The office conducts basic and applied research in the fields of polymer chemistry, computational chemistry, polymer physics, and physical and organic chemistry. It works to identify the chemical research and technology required for solutions to problems of national urgency, synchronous with the aeronautic and space effort. It conducts interdisciplinary research on chemical problems, mainly in areas of macromolecular science and fire research. The office also acts as liaison with the engineering community and assures that relevant technology is made available to other NASA centers, agencies, and industry. Recent accomplishments are listed in this report. Activities of the three research groups, Polymer Research, Aircraft Operating and Safety, and Engineering Testing, are summarized. A complete bibliography which lists all Chemical Research Projects Office publications, contracts, grants, patents, and presentations from 1975 to 1980 is included.

N80-31520/3 PC **A03**/MF **A01**
Propellants, Explosives and Rocket Motor Establishment, Westcott (England).
The Autoxidation of Hydrazine and Alkyl Substituted Hydrazine Vapors.
J. M. Bellerby. May 80, 30p PERME-MEMO-92, BR74110

The existing body of experimental work on the kinetics of the low temperature autoxidation of hydrazine and the alkyl substituted hydrazines, monomethylhydrazine (MMH) and unsymmetrical dimethylhydrazine (UDMH), is reviewed. In the particular case of the UDMH/O2 reaction (for which the most reliable data are available) a mechanism is put forward which involves the initial formation, by a chain process, of a hydroperoxide. This intermediate is then assumed to undergo wall reactions to give the observed major products. It is further proposed that the hydroperoxide acts as a chain branching agent in the gas phase, thereby giving rise to autocatalysis. The consequences of autocatalysis are examined and seen to account for several previously unexplained features of the kinetic data on the UDMH autoxidation. A full

scheme is then proposed for this reaction which successfully accounts for the major and minor products and for the overall stoichiometry.

N80-32190/4 PC **A18**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Atomic Emission Lines in the Near Ultraviolet; Hydrogen Through Krypton, Section 1.
R. L. Kelly. Apr 79, 403p NASA-TM-80268-Sec-1

A compilation of spectra from the first 36 elements was prepared from published literature available through October 1977. In most cases, only those lines which were actually observed in emission or absorption are listed. The wavelengths included range from 2000 Angstroms to 3200 Angstroms with some additional lines up to 3500 Angstroms. Only lines of stripped atoms are reported; no molecular bands are included.

N80-32191/2 PC **A17**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Atomic Emission Lines in the Near Ultraviolet; Hydrogen Through Krypton, Section 2.
R. L. Kelly. Apr 79, 384p NASA-TM-80268-Sec-2

A compilation of spectra from the first 36 elements was prepared from published literature available through October 1977. In most cases, only those lines which were actually observed in emission or absorption are listed. The wavelengths included range from 2000 Angstroms to 3200 Angstroms with some additional lines up to 3500 Angstroms. Only lines of stripped atoms are reported; no molecular bands are included.

N80-32196/1 PC **A05**/MF **A01**
Max-Planck-Institut fuer Stroemungsforschung, Goettingen (Germany, F.R.).
Measurements of Electronic Stimulation of Atoms in Collisions with Atoms and Molecules Near the Threshold Messung der Elektronischen Anregung von Atomen in Stoss MIT Atomen und Molekuelen in Schwellennaehe.
D. Pust. Jun 79, 82p MPIS-14/1979
Text in German.

The seeded beam experiment is described. The stimulation of Xe in collisions with Xe is measured. The experimental results confirm the theoretical calculation.

PAT-APPL-6-154 348 PC **A02**/MF **A01**
Department of the Navy Washington DC
Method of Separating Light Isotopes Like 15N from Naturally Abundant Gases, Such as NO.
Patent Application,
Jimmie R. McDonald, and Andrew P. Baronavski. Filed 29 May 80, 13p AD-D007 456/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method of separating and concentrating the N(15) isotope from natural abundance nitric oxide (NO), comprising mixing the natural abundance nitric oxide in an appropriate mole ratio with carbon dioxide (CO2); irradiating the NO-CO2 mixture with coherent laser light of a desired wavelength, thereby selectively exciting the nitric oxide species containing the 15N isotope, which subsequently reacts with the carbon dioxide to form nitrogen dioxide N(15)O2; and separating said nitrogen dioxide N(15)O2 from the gas mixture. (Author)

PB81-104341 Not available NTIS
National Bureau of Standards, Washington, DC.
Line Spectra of the Elements.
Final rept.,
J. Reader, and C. H. Corliss. 1980, 130p
Pub. in CRC Handbook of Chemistry and Physics, 61st Edition, Section E, General Physical Constants Line Spectra of the Elements, pE-219--E-348 1980.

These tables contain the outstanding spectral lines of neutral (I), singly ionized (II), doubly ionized (III), triply ionized (IV), and quadruply ionized (V) atoms. Listed are lines that appear in emission from the vacuum ultraviolet to the far infrared. For most atoms the lines were selected from much larger lists in such a way as to include the stronger observed lines in each spectral region. In a few cases prominent monoxide band heads are also given. Literature references for each spectrum are collected at the end of the entire set of tables. The wavelengths range from 40 to 40000 A. Many of the intensities represent quantitative estimates of relative line strengths that take account of varying detection sensitivity at different wavelengths. They are on a linear scale. For nearly all of the other lines the intensities represent qualitative estimates of the relative strengths of lines not greatly separated in wavelength.

PB81-104416 Not available NTIS
National Bureau of Standards, Washington, DC.
Products of the Reaction of Hydroxyl Radicals with Trans-2-Butene in the Presence of Oxygen and Nitrogen Dioxide.
Final rept.,
R. I. Martinez, R. E. Huie, and J. T. Herron. 15 Jun 80, 5p
Pub. in Chem. Phys. Lett., 72 n3 p443-447, 15 Jun 80.

The reactions of hydroxy-substituted alkyl radicals, formed as secondary products in the reaction of ozone with trans-2-butene, have been identified in photoionization mass spectrometry studies, using acetaldehyde and nitrogen dioxide as free-radical scavengers. Products derived from 2-hydroxy-1-methylpropyl in the absence of scavengers include 2,3-butanedione(diacetyl),3-hydroxy-w-butanone (acetoin), and 2,3-butanediol. In the presence of added acetaldehyde or nitrogen dioxide, the formation of these products is suppressed. In addition, with added nitrogen dioxide, new products are formed which have been identified as a series of oxalkyl and hydroxy-substituted-alkyl nitrates and preoxynitrates. These observations may have an important bearing on the chemistry of photochemical smog.

PB81-104424 Not available NTIS
National Bureau of Standards, Washington, DC.
Series Formulas for the Spectrum of Atomic Sodium (Na I).
Final rept.,
W. C. Martin. Jul 80, 5p
Pub. in Jnl. Opt. Soc. Am., 70 n7 p784-788 Jul 80.

The available data on the energy levels of Na I yield Ritz quantum-defect formulas predicting all one-electron (nl) levels with an uncertainty of plus or minus 3s sub 2 S sub 1/2 ground level. Such formulas are given here for the ns through nl series as expressions for the quantum defect delta in inverse even powers of n -- delta sub 0 with delta sub 0 constant for each of nl series. These formulas are usually more convenient for calculations than the formulas in powers of n -- delta and core-polarization formulas given previously. Term differences or quantum defects predicted by the ns through nh formulas are compared with a number of more recent experimental determinations in the range n = 13--41.

PB81-105330 PC **A03**/MF **A01**
Avco Everett Research Lab., Inc., Everett, MA.
Study of the Interaction of Plasma Proteins with Prosthetic Surfaces. V.
Annual rept. 1 Dec 76-30 Nov 77,
E. Nyilas, and T-H. Chiu. Jun 80, 50p NIH-N01-HV-3-2917-5
Contract N01-HV-3-2917
See also report dated Oct 77, PB-284 092.

Studies on the competitive interaction energetics of native human plasma proteins with different types of adsorbents were performed. Human platelet poor plasma (PPP), PPP diluted with Ringer's lactate (RL) solution, and serum (SER) were used. The adsorbents studied included microparticulate glass, LTI-carbon, and silicon alloyed LTI-carbon (SLTI). The interaction energetics under competitive conditions in PPP media is compared to the non-competitive sorption of fibrinogen from single protein-solute solutions.

PB81-106536 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC.
Journal of Research of the National Bureau of Standards. Volume 85, Number 4, Jul-Aug 1980.
Bi-monthly rept.
1980, 87p

See also Volume 85, Number 3, PB80-207707. Library of Congress catalog card no. 62-37059.

Contents:
A proposed coil system for the improved realization of the absolute ampere;
The polymer in a cone + A model for the surface free energy of polymer crystal with emergent cilia;
Representation of long-time creep in a pure-gum rubber vulcanizate;
Design aspects of Scheffe's calibration theory using linear splines.

PB81-106551
(Order as PB81-106536, PC **A05**/MF **A01**)
National Bureau of Standards, Washington, DC. National Measurement Lab.
The Polymer in a Cone-A Model for the Surface Free Energy of Polymer Crystal with Emergent Cilia,
C. M. Guttman,, E. A. DiMarzio, and J. D. Hoffman. 12 Mar 80, 11p
Included in Jnl. of Research of the National Bureau of Standards, v85 n4 p273-282 Jul-Aug 80.

A model is proposed to estimate the surface free energy of a small polymer crystal with numerous emergent cilia. For such a model the partition function of a polymr constrained to remain in a cone is computed. The partition function of the polymer in a cone is found to behave similarly to the polymer in a wedge discussed by Lauritzen and DiMarzio. The estimated end surface free energy per unit area for the small extended chain crystal is found to increase with increasing area, implying the presence of cumulative surface stress in such crystals. The forces between the cilia are reduced if folds are inserted in the surface.

PB81-108540 PC **A02**
North Carolina Univ. at Chapel Hill.
Determination of Calcium and Magnesium by Chelometric Indicator Titrations with the Cupric Ion Electrode,
Frank K. Arey, J. Wayne Chamblee, and Edgar Neckel. c1980, 10p UNC-SG-R-159, NOAA-80090907
Pub. in International Jnl. of Environmental Analytical Chemistry, v7 p261-277 1980. Prepared by East Carolina Univ., Greenville. Dept. of Chemistry.

A chelometric indicator titration technique using the cupric electrode was developed for application in the determination of Ca(+2) and Mg(+2) in estuarine waters and biological samples. This method has uses in both laboratory and field studies. In routine work, the lower limits of determination are about 0.2 ppm for Ca(+2) and for Mg(+2). If the Mg(+2) ions are in solution with Ca(+2), the calcium ion concentration must be of the same order of magnitude or smaller than the Mg(+2) concentration. A comparison has been provided between the data obtained by the titration technique and those of atomic absorption measurements. (Copyright (c) Gordon and Breach Science Publishers Inc., 1980.)

PB81-109092 PC **A04**/MF **A01**
National Council of the Paper Industry for Air and Stream Improvement, Inc., New York.
Evaluation and Application of SOx Measurement Procedures for Kraft Recovery Furnaces.
Project rept. Jul 76-Sep 80,
A. K. Jain, R. O. Blosser, D. B. Newport, and H. S. Oglesby. Sep 80, 63p EPA/600/2-80-186
Grant EPA-R-804644

The objective of this investigation was to determine the sulfuric acid (SO3/H2SO4) and sulfur dioxide (SO2) emissions from kraft recovery furnaces using an extractive sampling system. The Goksoyr and Ross controlled condensation technique was chosen. Equipment was designed and fabricated to evaluate the effect of coil length, grit porosity, temperature, flow rate, and concentration upon the efficiency of capture of H2SO4 in the modified Grahm condenser. The optimum design and operating conditions to minimize SO3/H2SO4 losses in filter holders used in the sampling train for particulate separation were determined, and the effects of recovery furnace particulate upon SO3/H2SO4 losses were investigated. Sampling of five representative Kraft recovery furnace stack

gases showed that the SO3/H2SO4 concentrations varied from 0 to 2.98 ppm, while the range of SO2 concentrations was from 14 to 416 ppm. A comparison of these emissions with the SO3/H2SO4 and SO2 emissions from oil and coal fired utility boilers shows the kraft recovery furnace emissions to be much lower.

PB81-109217 PC **A05**/MF **A01**
California Univ., Richmond. Center for a Quiet Environment.
Community Noise Control: Measurement and Regulation. Proceedings of a Conference Held at Tucson, Arizona on April 9-10, 1980.
Apr 80, 83p
Sponsored in part by Environmental Protection Agency, San Francisco, CA. Region IX.

Proceedings of a conference held in Tucson, Arizona, April 9-10, 1980, cosponsored by EPA, Center for a Quiet Environment, and Arizona State Department of Health Services. Presentations cover noise and acoustic terminology, health effects and subjective reactions to noise, the role of citizens and government in noise control, practical hints for noise control, and descriptions of noise programs in Salt Lake City, Utah, and Sacramento County, California.

PB81-109233 PC **A13**/MF **A01**
Avco Everett Research Lab., Inc., Everett, MA.
Study of the Interaction of Plasma Proteins with Prosthetic Surfaces.
Final rept. 1 Dec 72-30 Nov 78,
E. Nyilas, and T-H. Chiu. Jun 80, 279p NIH-N01-HV-3-2917-6
Contract N01-HV-3-2917
See also PB-284 092.

The interaction of blood with foreign surfaces is mediated by a conditioning layer of proteins which are adsorbed from plasma prior to the arrival and attachment of cellular blood components. Inasmuch as the conditioning protein layer influences the incidence of ensuring thromboembolic phenomena, determination of the energetics and mechanism of the adsorption processes is of primary importance. The protein adsorption studies summarized in this report have established quantitative differences in the 'intensities' of interactions that arise between chemically dissimilar materials (Glass, LTI-carbon) and native human proteins (Serum Albumin, gamma-(7S)-Globulin, Fibrinogen). The energetics involved in these interactions were found to be the primary determinant of the state of sorbed proteins.

PB81-110470 PC **A02**/MF **A01**
Florida State Univ., Tallahassee. Dept. of Chemistry.
Toxic Residues and Pollutants.
Journal article,
Ralph C. Dougherty. 1979, 20p EPA-600/J-80-077, ERL.GB-0063
Grant EPA-R-806334
Pub. in Biochemical Applications of Mass Spectrometry, Supplementary Volume 1 ch32A p951-968 1980.

The author discusses sample preparation, separation of xenobiotic chemicals from the bulk of the environmental substrate, and problems associated with pollutant analysis. The application of mass spectrometry (MS) to the detection of chemicals foreign to biology is reviewed, and cases are cited to demonstrate the use of MS in identifying or quantifying xenobiotic chemicals in samples obtained from the food chain, from contact sources, or from studies of human tissues and biofluids.

PB81-112377 Not available NTIS
National Bureau of Standards, Washington, DC.
Angle-Resolved Photon-Stimulated Desorption of Oxygen Ions from a W(111) Surface.
Final rept.,
T. E. Madey, R. L. Stockbauer, J. F. van der Veen, and D. E. Eastman. 1980, 4p
Sponsored in part by Office of Naval Research, Arlington, VA.
Pub. in Phys. Rev. Lett. 45, n3 p187-190, 21 Jul 80.

A definitive determination of angle-resolved photon-stimulated desorption of ions from a well-characterized adsorbate, and a direct comparison with electron-stimulated desorption are reported. Ion angular distributions, energy distributions, and photon excitation spectra for O(+) desorption from W(111) have been measured for oxygen coverages ranging from a fractional monolayer to a multilayer oxide.

PB81-800070 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electrochemical Reactions at Surfaces. 1976-September, 1980 (Citations from the NTIS Data Base).
Rept. for 1976-Sep 80,
Diane M. Cavagnaro. Oct 80, 153p
Supersedes PB80-800030, and NTIS/PS-78/1034. See also 1964-1975, NTIS/PS-78/1033.

This bibliography covers electrode processes in aqueous solutions. The citations discuss battery electrode reactions, fuel cell reactions, electrochemical corrosion studies, catalyst reactions, chemisorption, theoretical analysis, electrical double layer, and measurement techniques. Also included are some molten salt processes. (This updated bibliography contains 148 citations, 23 of which are new entries to the previous edition.)

PB81-800179 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nitrogen Oxide Air Pollution: Detection and Analysis. 1976-August, 1980 (Citations from the NTIS Data Base).
Rept. for 1976-Aug 80,
Diane M. Cavagnaro. Oct 80, 232p
Supersedes NTIS/PS-79/1058, and NTIS/PS-78/0972. Updates NTIS/PS-74/089. See also 1964-1975, NTIS/PS-77/0851.

Techniques and equipment used in the gas analysis of ambient atmospheres, exhaust emissions, and flue gases are cited in the bibliography. (This updated bibliography contains 226 citations, 22 of which are new entries to the previous edition.)

SKBF/KBS-TR-79-13 PC **A02**/MF **A01**
Kaernbraenslesaekerhet, Stockholm (Sweden).
Radiolytic Production of Free Hydrogen in a Bed of Clay.
T. Eriksen, and J. Lind. Mar 79, 18p
In Swedish.
U.S. Sales Only.

Measurements of the amount of molecular hydrogen formed radiolytically in gamma -irradiated sodium bentonite with varying water content have been carried out. Experiments have been carried out with 0,1-5 MPa Arpressure and 2-5 MPa mechanical (mercury) pressure applied to the bentonite. The results clearly show that a water content and pressure dependent equilibrium is obtained with hydrogen concentrations well below the hydrogen solubility in water. Titrations of slurries of 10 g irradiated and unirradiated bentonite in 100 g water with NaOH show dose dependent increase in the surface acidity of the bentonite. (Atomindex citation 11:511475)

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

AD-A089 280/2 PC **A04**/MF **A01**
Johns Hopkins Univ Baltimore MD
The Hauling-Out Behavior of the Pacific Walrus.
Technical rept.,
Douglas Wartzok, and G. Carleton Ray. 8 Sep 80, 57p Rept no. TR-25
Contract N00014-75-C-0701

Important questions on the natural history of marine mammals need to be answered before management can be placed on a more certain basis. We investigated one aspect of the natural history of Pacific walruses, Odobenus rosmarus divergens. We concentrated on walrus hauling-out behavior and the associated environmental factors which influence this behavior. We employed primarily visual photography and infrared imaging in order to gain new insights into the relationship between behavior and the environment. High-resolution color film proved to be the best remote sensing technique for distinguishing walruses from their haulout areas and for counting the animals. Infrared imaging was much better for detecting small groups of animals, particularly when the ice was broken up into many small floes. Most remote sensing flights were conducted at an altitude of 300 to 400 m since this altitude gave the best resolution for counting animals on the photographs.

AD-A089 356/0 PC **A02**/MF **A01**
Johns Hopkins Univ Baltimore MD School of Hygiene and Public Health
Mechanical Transmission of Larval Trichinella by Arctic Crustacea.
Technical rept.,
Karen L. Hulebak. 16 Feb 79, 6p Rept no. TR-24
Contracts N00014-75-C-0701, NAS2-9300
Pub. in Canadian Jnl. of Zoology, v58 n7 p1388-1390 1980.

No abstract available.

PB81-105413 PC **A10**/MF **A01**
National Marine Fisheries Service, Seattle, WA.
Fishery Bulletin. Volume 78, Number 1, 1980.
1980, 204p NOAA-80090906
See also Volume 78, Number 1, PB80-226749.

This issue contains the following articles: Life history patterns in marine fishes and their consequences for fisheries management; Species of Munidopsis (Crustacea, Galatheidae) occurring off Oregon and in adjacent waters; Using Markov decision models and related techniques for purposes other than simple optimization: analyzing the consequences of policy alternatives on the management of salmon runs; Organochlorine residues in fishes from the northwest Atlantic Ocean and Gulf of Mexico; Systematics and distribution of certioid anglerfishes of the family Melanocetidae with the description of a new species from the eastern North Pacific Ocean; Early life history of Pacific mackerel, Scomber japonicus; Spawning and fecundity of Atlantic mackerel, Scomber scombrus, in the Middle Atlantic Bight; Respiration and depth control as possible reasons for swimming of northern anchovy, Engraulis mordax, yolk-sac larvae; Descriptionsof larval silver perch, Bairdiella chrysoura, banded drum, Larimus fasciatus, and star drum, Stellifer lanceolatus (Sciaenidae); Reproductive biology of vermillion snapper from North Carolina and South Carolina; and Observations on early life stages of Atlantic tomcod.

PB81-105421
(Order as PB81-105413, PC **A10**/MF **A01**)
National Marine Fisheries Service, Tiburon, CA. Tiburon Lab.
Life History Patterns in Marine Fishes and Their Consequences for Fisheries Management,
Peter B. Adams. Sep 79, 13p NOAA-80090906-1
Included in Fishery Bulletin, v78 n1 p1-12 1980.

Natural selection operates at the life history level to maximize the number of surviving offspring. Life history characteristics will vary in consistent patterns to meet this constraint. When theoretical patterns in life histories were investigated in terms of r and K selection and compared with actual trends in life history characteristics of fishes, the agreement between observed and predicted trends was significant.

PB81-105439
(Order as PB81-105413, PC **A10**/MF **A01**)
Oregon State Univ., Corvallis. School of Oceanography.
Species of 'Munidopsis' (Crustacea, Galtheidae) Occurring off Oregon and in Adjacent Waters,
Julie W. Ambler. Aug 79, 23p NOAA-80090906-2
Grant NSF-GB-4629
Sponsored in part by Atomic Energy Commission, Washington, DC., and Office of Naval Research, Arlington, VA.
Included in Fishery Bulletin, v78 n1 p13-34 1980.

Twelve species of Munidopsis (Decapoda: Crustacea: Galatheidae) were collected from the continental slope, Cascadia Basin, and Tufts Abyssal Plain off Oregon and in adjacent waters. Three new species are described: Munidopsis cascadia, M. tuftsi, and M. yaquinesis.

PB81-105454
(Order as PB81-105413, PC **A10**/MF **A01**)
National Marine Fisheries Service, Seattle, WA. Northwest and Alaska Fisheries Center.
Organochlorine Residues in Fishes from the Northwest Atlantic Ocean and Gulf of Mexico,
Virginia F. Stout. Aug 79, 9p NOAA-80090906-4
Included in Fishery Bulletin, v78 n1 p51-58 1980.

Residues of Sigma DDT (p,p'-DDT and its metabolites p,p'-TDE and p,p'-DDE), PCB (polychlorinated biphenyls), dieldrin, and endrin were determined in the flesh of 700 specimens of fishes caught between 1973 and 1975 in the northwestern Atlantic Ocean and northern Gulf of Mexico off the coasts of the southeastern United States. The highest level in any one composite sample of 10 fish was 1.0 ppm Sigma DDT, 1.8 ppm PCB, 0.026 ppm dieldrin, and 0.026 ppm endrin.

PB81-105462
(Order as PB81-105413, PC **A10**/MF **A01**)
Washington Univ., Seattle. Coll. of Fisheries.
Systematics and Distribution of Ceratioid Anglerfishes of the Family Melanocetidae with the Description of a New Species from the Eastern North Pacific Ocean,
Theodore W. Pietsch, and John P. Van Duzer.
Sep 79, 30p NOAA-80090906-5
Grants NSF-GB-40700, NSF-DEB76-82279
Sponsored in part by National Geographic Society, Washington, DC., and Public Health Service, Rockville, MD.
Included in Fishery Bulletin, v78 n1 p59-87 1980.

The ceratioid anglerfish family Melanocetidae is revised on the basis of a study of approximately 600 specimens collected from all oceans. Of the 11 nominal species of Melanocetus based on females, 4 are recognized. A fifth species is newly described from a single female collected from the eastern Pacific Ocean.

PB81-105470
(Order as PB81-105413, PC **A10**/MF **A01**)
National Marine Fisheries Service, La Jolla, CA. Southwest Fisheries Center.
Early Life History of Pacific Mackerel, 'Scomber japonicus',
John R. Hunter, and Carol A. Kimbrell. Oct 79, 14p NOAA-80090906-6
Included in Fishery Bulletin, v78 n1 p89-101 1980.

The early life history of Pacific mackerel, Scomber japonicus, is described from laboratory-rearing studies and examination of stomach contents of sea-caught larvae.

PB81-105488
(Order as PB81-105413, PC **A10**/MF **A01**)
National Marine Fisheries Service, Highlands, NJ. Sandy Hook Lab.
Spawning and Fecundity of Atlantic Mackerel, 'Scomber scombrus', in the Middle Atlantic Bight,
Wallace W. Morse. Aug 79, 7p NOAA-80090906-7
Included in Fishery Bulletin, v78 n1 p103-108 1980.

Collections of Atlantic mackerel, Scomber scombrus, were made during spring 1977 from Maryland to Rhode Island. Length-weight relationships were determined for total and fork lengths and total and gutted weights. Spawning time was determined. Egg diameter frequences from running ripe ovaries indicated five to seven egg batches are spawned by each female during the spawning season. Fecundity was estimated and ranged from 285,000 to 1,980,000 for fish between 307 and 438 mm fork length.

PB81-105496
(Order as PB81-105413, PC **A10**/MF **A01**)
National Marine Fisheries Service, La Jolla, CA. Southwest Fisheries Center.
Respiration and Depth Control as Possible Reasons for Swimming of Northern Anchovy, 'Engraulis mordax', Yolk-Sac Larvae,
Daniel Weihs. Jul 79, 10p NOAA-80090906-8
Included in Fishery Bulletin, v78 n1 p1090117 1980.

Larval northern anchovy in the yolk-sac (nonfeeding) stage exhibit regular bursts of continuous swimming during the first 3 days after hatching. It has been suggested that this behavior may have a respiratory function. A different possibility is depth control, countering the tendency of the larvae to sink when motionless. This paper includes a theoretical and experimental investigation of the possible functions of these swimming bouts.

PB81-105504
(Order as PB81-105413, PC **A10**/MF **A01**)
South Carolina Wildlife and Marine Resources Dept., Charleston. Marine Resources Research Inst.
Descriptions of Larval Silver Perch, 'Bairdiella chrysoura', Banded Drum, 'Larimus fasciatus', and Star Drum, 'Stellifer lanceolatus' (Sciaenidae),
Howard Powles. Aug 79, 19p CONTRIB-94
Contract NOAA-6-35147
Marine Resources Monitoring Assessment and Prediction Contrib. no. 164.
Included in Fishery Bulletin, v78 n1 p119-136 1980.

This paper presents descriptions and illustrations of larval Bairdiella chrysoura (1.1-8.8 mm standard length), Larimus fasciatus (3.0-5.9 mm standard length), and Stellifer lanceolatus (2.8-15.1 mm standard length). Larimus fasciatus larvae are characterized by brain pigment, pectoral fin pigment, and early-developing pectoral fin rays.

PB81-105512
(Order as PB81-105413, PC **A10**/MF **A01**)
Rutgers - The State Univ., New Brunswick, NJ.
Reproductive Biology of the Vermilion Snapper, 'Rhomboplites aurorubens' from North Carolina and South Carolina,
Churchill B. Grimes, and Gene R. Huntsman. Jul 79, 11p NOAA-80090906-10
Included in Fishery Bulletin, v78 n1 p137-146 1980.

The vermilion snapper, Rhomboplites aurorubens, a species often associated with Caribbean reefs and banks, is an important recreational fish of the outer continental shelf of North Carolina and South Carolina. Serial spawning occurs from late April through September off the Carolinas at depths ranging from 31 to 91 m. Most females spawn in the third or fourth year at about 205-275 mm total length. Fecundity of first spawners is estimated at 17-42 thousand eggs, and large females produce 1.5 million eggs.

PB81-105520
(Order as PB81-105413, PC **A10**/MF **A01**)
Fisheries and Marine Service, St. Andrews (New Brunswick). Biological Station.
Observations on Early Life Stages of Atlantic Tomcod, 'Microgadus tomcod',
R. H. Peterson, F. H. Johansen, and J. L. Metcalfe. Sep 79, 13p NOAA-80090906-11
Included in Fishery Bulletin, v78 n1 p147-158 1980.

In southern New Brunswick, tomcod spawn in streams from late December to mid-January. The benthic eggs hatch and newly hatched larvae drift to sea in mid-March to mid-April at which time ocean temperatures are beginning to increase. Larval migration to sea is probably aided by active swimming of larvae to the surface to fill the swim bladder, which must be filled within 24 hours of hatching. Water uptake and salt excretion problems are minimized for eggs reared in freshwater, and under the experimental conditions described here.

PB81-106809 PC **A07**/MF **A01**
Martin Marietta Corp., Baltimore, MD. Environmental Center.
Summary of Findings: Calvert Cliffs Nuclear Power Plant Aquatic Monitoring Program. Volume I.
Final rept. 1968-80.
Aug 80, 133p PPSP-CC-80-2-V-1
See also Volume 2, PB81-106817.
Also available in set of 3 reports PC E20, PB81-106791.

This document summarizes and interprets findings from aquatic monitoring studies that have been conducted since 1968 at the site of Baltimore Gas and Electric Company's Calvert Cliffs Nuclear Power Plant on the Chesapeake Bay. The main text given an overview of all the studies, summarizes major findings, and draws conclusions about the impact of plant operations on the Bay ecosystem.

PB81-106817 PC **A18**/MF **A01**
Martin Marietta Corp., Baltimore, MD. Environmental Center.
Summary of Findings: Calvert Cliffs Nuclear Power Plant Aquatic Monitoring Program. Volume II, Appendices A - C.
Aug 80, 415p PPSP-CC-80-2-V-2
See also Volume 1, PB81-106809 and Volume 3, PB81-106825.
Also available in set of 3 reports PC E20, PB81-106791.

The report includes baseline studies for the environmental impacts of Calvert Cliffs Nuclear Power Plant construction which is located on the Chesapeake Bay. This appendix summarizes monitoring studies on: A--physical and chemical variables; B--phytoplankton; C--zooplankton.

PB81-106825 PC **A16**/MF **A01**
Martin Marietta Corp., Baltimore, MD. Environmental Center.
Summary of Findings: Calvert Cliffs Nuclear Power Plant Aquatic Monitoring Program. Volume III, Appendices D - H.
Aug 80, 369p PPSP-CC-80-2-V-3
See also Volume 2, PB81-106817.
Also available in set of 3 reports PC E20, PB81-106791.

The report includes baseline studies for environmental impacts of Clavert Cliffs Nuclear Power Plant construction which is located on the Chesapeake Bay. The appendix summarizes monitoring studies on: benthic invertebrates (including clams, crabs, and oysters); finfish; and ecosystem.

PB81-107963 PC **A04**/MF **A01**
California Univ., Berkeley. Bodega Bay Inst. of Pollution Ecology.
Population Biology of Harbor Seals in San Francisco Bay, California.
Final rept.,
R. W. Risebrough, D. Alcorn, S. G. Allen, V. C. Anderlini, and L. Booren. Oct 80, 74p MMC-76/19
Contract MM6AC006

The study described in this report was undertaken to determine the current status of the population of harbor seals that is resident in San Francisco Bay, to assess the impact of pollution on the reproductive capacity and viability of this population, and to provide recommendations for a long term policy of protection and management.

PB81-108565 PC **A02**
North Carolina Univ. at Chapel Hill.

Group 8A—Biological Oceanography

Sanitary Significance of the Bacterial Flora of the Brackish Water Clam, 'Rangia cuneata', in Albermarle Sound, North Carolina,
Paul G. Comar, Barnard E. Kane, Jr., and Donald B. Jeffreys. 1979, 11p UNC-SG-R-155, NOAA-80090911
Grant NOAA-04-8-M01-66
Pub. in Proceedings of National Shellfisheries Association, v69, p92-100 1979. Prepared by East Carolina Univ., Greenville, NC.

The bacteriology of Rangia cuneata was studied to assess the sanitary safety in harvesting this clam for human consumption. Standard plate counts fluctuating from tens of thousands to tens of millions per gram were recorded on fresh clam meat. These numbers are relatively high in comparison to levels recorded in other edible shellfish. The bacteriological quality of the clams showed a median fecal coliform count of 80 FC/100 g, but 23% of the samples exceeded 230 FC/100 g. Potentially pathogenic bacteria of the genera Salmonella, Shigella, Vibrio, and Staphylococcus were recovered at very low levels.

PB81-109852 PC **A06**/MF **A01**
Rhode Island Univ., Kingston. Graduate School of Oceanography.
Comparative Evaluation of Aerial and Shipboard Sampling Techniques for Estimating the Abundance of Humpback Whales ('Megaptera novaeangliae').
Final rept.,
Gerald P. Scott, and Howard E. Winn. Oct 80, 111p MMC-77/24
Contract MM7AC029

The primary objectives of the work presented were to compare various sampling techniques for assessing the abundance of humpback whales (Megaptera novaeangliae) in the western north Atlantic and to critically evaluate the size, distribution, movements, and status of the stocks on Silver and Navidad Banks, West Indies.

PB81-109860 PC **A06**/MF **A01**
Scripps Institution of Oceanography, La Jolla, CA.
Studies of a Nearshore Community Inhabited by Sea Otters.
Final rept.,
Paul K. Dayton, Brian D. Keller, and David A. Ven Tresca. Oct 80, 105p MMC-78/14
Contracts MM6AC026, MM1300702-9

The purpose of this research is to understand aspects of the 'health and stability' of central California kelp communities with emphasis on those aspects that are relevant to sea otters. In this report the author discusses two important questions: (1) What are the mechanisms that structure and stabilize the kelp populations. (2) What factors influence the food resources and carrying capacity of sea otters; specifically, are there endogenous factors influencing the recruitment of their prey and are there other carnivores that might compete with the otters for the prey. Objectives were to consider the resilience of patch types in the intertidal community and to make some simple but regular observations of sea otter foraging behavior.

PB81-110488 Not available NTIS
Environmental Research Lab., Gulf Breeze, FL.
Marine and Estuarine Pollution.
Journal article,
Donald J. Reish, Gill C. Geesey, Thomas J. Kauwling, Frank G. Wilkes, and Alan J. Mearns. Jun 80, 45p EPA-600/J-80-097, ERL-GB-J072
Pub. in Jnl. of Water Pollution Control Fed., v52(6) p1533-1575 Jun 80.

This literature review summarizes current data on the effects of pesticides on marine organisms, aquatic environmental research methods, bioaccumulation of pesticides by estuarine and marine organisms, and biota residue. Results of studies of the environmental effects of dredging, dumping, and wastewater sludge are reported. The occurrence of diseases and tissue abnormalities in fishes is discussed, as well as research related to marine oil pollution.

8B. Cartography

AD-A089 297/6 MF **A01**
Defense Mapping Agency Hydrographic and Topographic Center Washington DC
DMA's Role With the Mariner,
Dennis J. Granato. Sep 80, 25p
Availability: Microfiche copies only.

This paper addresses the organization, mission, and service that the Defense Mapping Agency (DMA), specifically, the Hydrographic/Topographic Center (HTC), provides to the general mariner. Included in the discussion are the following: the interface between DMA and the merchant mariner, how the requirements process works to support merchant marine activities, and how the merchant marine can aid DMA's product availability and accuracy through a data collection effort. (Author)

N80-31855/3 PC**$10.50**
National Aeronautics and Space Administration, Washington, DC.
Earth Resources: A Continuing Bibliography (Issue 26).
Jul 80, 118p NASA-SP-7041(26)

This bibliography lists 480 reports, articles, and other documents introduced into the NASA scientific and technical information system between April 1, 1980 and June 30, 1980. Emphasis is placed on the use of remote sensing and geophysical instrumentation in spacecraft and aircraft to survey and inventory natural resources and urban areas. Subject matter is grouped according to agriculture and forestry, environmental changes and cultural resources, geodesy and cartography, geology and mineral resources, hydrology and water management, data processing and distribution systems, instrumentation and sensors, and economic analysis.

8C. Dynamic Oceanography

AD-A089 235/6 PC **A02**/MF **A01**
Florida State Univ Tallahassee Dept of Oceanography
Near-Bottom Speed and Temperature Observations on the Blake-Bahama Outer Ridge,
Georges L. Weatherly, and Mark Wimbush. 3 Jul 79, 13p Rept no. 171
Contracts N00014-75-C-0201, N00014-76-c-0226
Pub. in Jnl. of Geophysical Research, v85 nC7 p3971-3981, 20 Jul 80.

No abstract available.

AD-A089 361/0 Not available NTIS
Washington Univ Seattle Dept of Oceanography
Microstructure Patches in the Thermocline,
M. C. Gregg. 31 Aug 79, 29p Rept no. CONTRIB-1137
Contract N00014-75-C-0502
Availability: Pub. in Jnl. of Physical Oceanography, v10 n6 p915-943 Jun 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A089 362/8 PC **A02**/MF **A01**
Louisiana State Univ Baton Rouge Coastal Studies Inst
Flowslides in Muds on Extremely Low Angle Tidal Flats, Northeastern South America.
Technical rept.,
John T. Wells, David B. Prior, and James M. Coleman. 16 Nov 79, 8p Rept no. TR-307
Contract N00014-75-C-0192
Pub. in Geology, v8 p272-275 Jun 80.

No abstract available.

AD-A089 624/1 PC **A02**/MF **A01**
Coastal Engineering Research Center Fort Belvoir VA
Interpretation of Wave Energy Spectra.
Coastal engineering technical aid rept.,
Edward F. Thompson. Jul 80, 23p Rept no. CERC-CETA-80-5

Guidelines for interpreting nondirectional wave energy spectra are presented. A simple method is given for using the spectrum to estimate a significant height and period for each major wave train in most sea states. The method allows a more detailed and accurate description of ocean surface waves than that given by a single significant height and period, yet it eliminates much of the formidable detail of a full spectrum. An example problem illustrating application of the method is presented. Spectral analysis and display techniques, and the natural variation of spectra in space and time, are discussed. (Author)

AD-A089 645/6 PC **A03**/MF **A01**
Institute for Defense Analyses Arlington VA Science and Technology Div
Internal Wave Induced Magnetic Field and Magnetic Field Gradient Spectra as Would Be Measured By an Airborne Magnetic Sensor.
Final rept.,
Wasyl Wasylkiwskyj, and Elaine Marcuse. May 80, 50p IDA-P-1465, IDA/HQ-80-22011, AD-E500 206
Contract MDA-903-79-C-0202

Technique is described for computing internal wave induced magnetic field and magnetic field spectra as these would be measured by airborne magnetic sensors. The intended application is remote sensing of internal wave activity in the upper layers of a deep ocean in the wavelength range less than 1 km. A computer program (INTWAVE) is presented which is capable of accepting data from towed thermistor chain measurements. Numerical results obtained with INTWAVE are presented for the measured internal wave spectra reported by Nelson and Milder (4).

PB81-108250 PC **A03**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
Logarithmic Normalization to Remove Unknown Signal-Gain Factors Before Averaging.
Technical memo.,
Donald E. Barrick. Apr 80, 26p NOAA-TM-ERL-WPL-56, NOAA-80081318

To increase the effective number of samples when averaging radar-echo spectra, unknown multiplicative factors (such as path losses) that vary from spectrum to spectrum must first be removed. A method of logarithmically normalizing the separate spectra is presented here, and the errors incurred in its use are determined. In terms of accuracy and ease of implementation, logarithmic normalization is better than alternative methods. Examples illustrating its application to HF sea echo are provided, and overall errors in extracting sea-state parameters are obtained and compared with the errors resulting from other normalization procedures.

PB81-108359 PC **A02**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
A Mathematical Model for How Ionospheric Reflection Degrades Sea-Echo Spectra.
Technical memo.,
T. M. Georges, and R. M. Jones. Jun 80, 20p NOAA-TM-ERL-WPL-60, NOAA-80081802

When sea-echo Doppler spectra is measured with a skywave radar, ionospheric irregularities often distort the received signal so much that sea-state information cannot be readily extracted. To understand and eventually deal with the distortion, a mathematical model was constructed. It represents the main ionospheric effects as a frequency-domain convolution of two more readily modeled quantities: one is the undistorted sea-echo amplitude spectrum; the other is an ionospheric path function that is the spectrum (including phase) of a monochromatic transmission over the ionospheric radar paths. Multipath effects on the received power spectrum are complicated by phase interference, which the convolution model represents by the cross terms that result when the convolution is squared. The model allows estimations on how much the distortion can be reduced by incoherent averaging and other processing strategies.

PB81-109324 PC **A09**/MF **A01**
Woods Hole Oceanographic Institution, MA.

Development and Application of a Field Instrumentation System for the Investigation of Surf Zone Hydrodynamics.
Master's thesis,
Matthew Noble Greer. Feb 79, 177p WHOI-80-36, NOAA-80090804
Grant NOAA-04-7-158-44079

The development and application of an autonomous field instrumentation system consisting of four current meters and four wave gauges, along with a field monitor and digital recorder is described in the report.

8E. Geodesy

AD-A089 599/5 PC **A03**/MF **A01**
Royal Aircraft Establishment Farnborough (England)
Odd Zonal Harmonics in the Geopotential, from Analysis of 28 Satellite Orbits.
Technical rept.,
D. G. King-Hele, C. J. Brookes, and G. E. Cook. Feb 80, 50p RAE-TR-80023, DRIC-BR-73771

The geopotential is usually expressed as an infinite series of spherical harmonics, and the odd zonal harmonics are the terms independent of longitude and antisymmetric about the equator: they define the 'pear-shape' effect. The coefficients J3, J5, J7, ... of these harmonics have been evaluated by analysing the variations in eccentricity of 28 satellite orbits from near-equatorial to polar. Most of the orbits from our previous determination in 1973 are used again, but three new orbits are added, including two at inclinations between 62 degrees and 63 degrees, which have been specially observed for more than five years by the Hewitt cameras. With the help of the new orbits and revised theory, we have obtained sets of J-coefficients with standard deviations about 40% lower than before.

N80-32050/0 PC **A03**/MF **A01**
Texas A&M Univ., College Station.
Altimetry Data over Trenches and Island-Arcs and Convection in the Mantle.
Final Report, 1 Nov. 1979 - 31 Aug. 1980.
18 Sep 80, 26p NASA-CR-163516
Contracts NCC5-11, NAGS-94

Transfer function techniques were developed to calculate the isostatic component of the geoid signal over trench/island arc/back arc systems. Removal of this isostatic component from geoid profiles determined by GEOS 3 radar altimetry leaves a residual geoid that can be attributed to the effect of mass inhomogeneities below the depth of compensation. Efforts are underway to extend the analysis to all the major trench/island arc systems of the world in order to provide more detailed understanding of the dynamic processes occurring beneath island arcs.

PB81-108383 PC **A04**/MF **A01**
National Geodetic Survey, Rockville, MD.
Haystack-Westford Survey.
Technical memo.,
W. E. Carter, C. J. Fronczek, and J. E. Pettey. Sep 79, 65p NOAA-TM-NOS-NGS-21, NOAA-80010902

A special purpose three-dimensional geodetic survey was conducted in the vicinity of the Haystack-Westford Radio Observatory complex near Boston, Mass. The survey included a high accuracy network connecting points of interest within the observatory complex and connections to the North American Datum (NAD) and the National Geodetic Vertical Datum (NGVD).

8G. Geology and Mineralogy

AD-A089 154/9 PC **A02**/MF **A01**
Princeton Univ NJ Dept of Statistics
Statistics in Geology.
Technical rept.,
Geoffrey S. Watson. Jul 80, 11p Rept no. TR-168-SER-2
Contract N00014-79-C-0322

This article, prepared for the Encyclopaedia of Statistical Sciences, gives many references to geological papers according to the statistical methods used. It should be useful to anyone preparing a course for geologists. It may also aid statisticians looking for applications of techniques. (Author)

AD-A089 205/9 PC **A02**/MF **A01**
Colorado State Univ Fort Collins
Episodic Erosion in Steep Terrain.
Final rept. 20 Jun 78-19 Jun 80,
Stanley A. Schumm. 19 Aug 80, 14p ARO-15875.5-GS
Grant DAAG29-78-G-0135

It has been suggested that sediment yields and landform evolution in steeplands of high-sediment production may be episodic; that is, the fluvial system is in metastable equilibrium, and periods of erosion are separated by periods of stability or deposition. Episodic deposition as well as episodic erosion should be recognized in steeplands. The two when occurring within a fluvial system can be referred to as the episodic behavior of that system. A model study of episodic behavior was made in the Kraft Badlands in eastern Wyoming during the summer of 1978 (bergstrom, 1980). In addition, experimental studies of sediment movement, drainage network and channel changes were carried out in the Rainfall-Erosion Facility during the summer of 1978 and a field check on the experimental results was made in the Little South Fork of the Cache la Poudre River near Fort Collins, Colorado (Harvey, 1980) where a series of sediment samples were taken during the 1979 runoff season to document daily and hourly changes of sediment load and sediment type. (Author)

INIS-mf-5691 PC **A06**/MF **A01**
Leiden Rijksuniversiteit (Netherlands).
U-Pb Systematics and the Petrogenetic Evolution of Infracrustal Rocks in the Paleozoic Basement of Western Galicia (NW Spain).
R. P. Kuijper. 1979, 101p
U.S. Sales Only.

The author presents the results of investigations on the U-Pb systematics of zircons, monazites and whole-rocks from the Paleoxioc basement of western Galicia. (Atomindex citation 11:524989)

PB81-108631 CP **T02**
Geological Survey, Menlo Park, CA.
Magnetic Computer Tape Containing Analytical Data from Rock, Stream-Sediment, and Stream-Sediment Heavy-Mineral Concentrate Samples from Bradfield Canal, Southeastern Alaska.
Data file,
Richard D. Koch, Richard M. O'Leary, and Donald A. Risoli. Jul 80, mag tape DOI/DF-80/004
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying chracter set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB81-108649.

The report contains a magnetic Computer Tape containing analytical data from rock, stream-sediment, and stream-sediment heavy-mineral concentrate samples from Bradfield Canal, southeastern Alaska.

PB81-108649 PC **A03**/MF **A01**
Geological Survey, Menlo Park, CA.
Magnetic Tape Containing Trace Element Data for Rock, Stream-Sediment, and Stream-Sediment Heavy-Mineral Concentrate Samples from the Bradfield Canal Quadrangle, Southeastern Alaska,
Richard D. Koch, R. M. O'Leary, and D. A. Risoli. 1980, 28p DOI/DF-80/004A
For system on magnetic tape, see PB81-108631.

Magnetic tape containing geochemical data from rock, stream-sediment, and stream-sediment heavy mineral concentrate samples collected in the Bradfield Canal quadrangle, southeastern Alaska. Three files contain data from 2784 rock samples, 1295 stream-sediment samples, and 219 stream-sediment heavy-mineral concentrate samples respectively. Data includes analyses for up to 31 elements by emission spectroscopy and up to 5 elements by atomic absorption techniques and geodetic coordinates in decimal degrees. Rock samples are labelled with the rock type sampled. Text (23 pages) describes sampling procedures and lists references.

PB81-109571 PC **A02**
Woods Hole Oceanographic Institution, MA.
Particulate Calcium Carbonate in New England Shelf Waters: Result of Shell Degradation and Resuspension,
M. G. Fitzgerald, C. M. Parmenter, and J. D. Milliman. c1979, 6p CONTRIB-4213, NOAA-80090811
Prepared in cooperation with Geological Survey, Woods Hole, MA.

Aragonite and calcite needles, 30-500 micro m long, were found to be prominent visual components throughout the water column in some areas of the New England (northeastern U.S.A.) continental shelf during winter months. Further investigation showed these needles to be laths derived from the degradation of mollusc shells which were resuspended from bottom sediments during winter storms. Such degradation and subsequent transport/dissolution of carbonate particles may help explain why the terrigenous 'starved' shelf sediments off New England contain such small amounts of calcium carbonate. (Copyright (c) 1979 International Association of Sedimentologists.)

8H. Hydrology and Limnology

AD-A089 495/6 PC **A03**/MF **A01**
Geological Survey Austin TX Water Resources Div
Technique for Estimating the Magnitude and Frequency of Floods in the Houston, Texas, Metropolitan Area.
Final rept.,
Fred Liscum, and B. C. Massey. Apr 80, 40p
Rept nos. USGS/WRD/WRI-80-037, USGS/WRI-80-17

A technique for estimating the magnitude and frequency of floods in the Houston, Texas, metropolitan area was developed by use of a multiple-regression flood-frequency analysis of flow data from unregulated streams in the area. A regression model, relating flood-peak discharge to concurrent rainfall and antecedent soil moisture conditions, was used to simulate 67-year records of annual peak discharges. Flood-frequency characteristics were determined for the simulated annual peaks and for the observed annual peaks at each of 22 gaging stations. Drainage area, bank-full channel conveyance, and percentage of urban development were used as independent variables; and weighted flood-frequency discharges were used as dependent variables in the multiple regression analysis. Relationships applicable to unregulated streams were developed for predicting floods with recurrence intervals of 2, 5, 10, 25, 50, 100, and 500 years. Drainage basins ranged in area from 1.33 to 182 square miles. The percentage of urban development in these basins ranges from 37 to 98.9 percent. The relationships indicate that as a basin changes from a completely natural state to one of complete urbanization, the magnitude of a 2-year peak discharge is increased by a factor of 4.2, the magnitude of a 50-year peak is increased by a factor of 4.9, and the magnitude of a 100-year peak is increased by a factor of 4.9. (Author)

AD-A089 518/5 PC **A09**/MF **A01**
Naval Postgraduate School Monterey CA
Precision of Tidal Datums in the Sacramento River, California.
Master's thesis,
Timothy Alan Bouquet. Jun 80, 184p Rept no. NPS68-80-007

A method is developed for extending computed 19-year tidal datums (1960-1978 epoch) throughout the ocean/river transition zone of the Sacramento River System using water-level measure-

ments from two long-term reference stations, at San Francisco and Sacramento, and collected over an 18-month period at seven secondary tide measuring stations located throughout the transition zone. The method uses the standard procedure of the National Ocean Survey for comparison of simultaneous observations to determine 19-year tidal characteristics as a function of river level, from which are determined the 19-year datums. The accuracy of tidal datums, indicated by the standard deviation, is found to be within 0.1 foot in the lower bay system and within 0.2 foot upriver. (Author)

PB81-103889 PC **A03**/MF **A01**
Geological Survey, Trenton, NJ. Water Resources Div.
Investigation of Acidity and Other Water-Quality Characteristics of Upper Oyster Creek, Ocean County, New Jersey.
Water-resources investigations (Final),
Thomas V. Fusillo, James C. Schornick, Jr., Harry E. Koester, and Douglas A. Harriman. Jul 80, 37p USGS/WRD/WRI-80/052, USGS/WRI-80-10
Prepared in cooperation with New Jersey Dept. of Environmental Protection, Trenton. Div. of Fish, Game, and Shellfisheries.

Water-quality data collected in the upper Oyster Creek drainage basin indicate that the stream has excellent water quality except for a persistently low pH. The mean concentrations of the major inorganic ions were all less than 6.0 mg/l. Mean concentrations of total nitrogen and total phosphorus were 0.15 mg/l and 0.01 mg/l, respectively. Dissolved oxygen averaged 8.7 mg/l and 81 percent saturation. Low pH levels are typical of streams draining cedar swamps. In Oyster Creek, the pH tended to decrease downstream due to chemical and biological processes.

PB81-105397 PC **A09**/MF **A01**
Geological Survey, Columbus, OH. Water Resources Div.
Water Resources Data for Ohio, Water Year 1979. Volume 2. St. Lawrence River Basin.
Water-data rept. (Annual) 1 Oct 78-30 Sep 79. Jun 80, 193p USGS/WRD/HD-80-053, USGS-WDR-OH-79-2

Water resources data for the 1979 water year for Ohio consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality of ground-water wells. This report in three volumes contains records for water discharge at 197 gaging stations; stage and contents at 32 lakes and reservoirs; water quality at 54 gaging stations and 49 wells; and water levels at 157 observation wells. Also included are data for 58 crest-stage partial-record stations; 26 low-flow partial-record stations, and 311 coal hydrology synoptic sites.

PB81-105405 PC **A08**/MF **A01**
Geological Survey, Columbus, OH. Water Resources Div.
Water Resources Data for Ohio, Water Year 1979. Volume 3. Coal Areas.
Water-data rept. (Annual) 1 Oct 78-30 Sep 79. Jul 80, 169p USGS/WRD/HD-80/062, USGS/WDR-08/79-3
See also Volume 1, PB80-115686.

Water resources data for the 1979 water year for Ohio consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality of ground-water wells. This report in three volumes contains records for water discharge at 197 gaging stations; stage and contents at 32 lakes and reservoirs; water quality at 54 gaging stations and 49 wells; and water levels at 157 observation wells. Alsc included are data for 58 crest-stage partial-record stations; 26 low-flow partial-record stations, and 311 coal hydrology synoptic sites.

PB81-105793 PC **A02**/MF **A01**
National Heart, Lung, and Blood Inst., Bethesda, MD.
Watersheds as the Basic Ecosystem: This Conceptual Framework Provides a Basis for a Natural Classification System.
Journal article,
Frederick B. Lotspeich. Aug 80, 9p EPA-600/J-80-069
Pub. in Water Resources Bulletin, v16 n4 p581-586 Aug 80.

A scheme is outlined to classify watersheds as ecosystems, based on their natural attributes. Two physical factors of the environment, climate and geology, are selected as state factors. Climate is the master factor that supplies energy and water to all ecosystems; geologic structure supplied the material from which the forces of climate carve landforms to establish ecosystems. At the next lower level, soil and vegetation interact in a succession of transactions to produce a mosaic of tesseras within each watershed. It is these interacting tesseras that moderate climate and store energy within the ecosystem that influences the embedded stream. Thus, there is a controlling force consisting of two elements (Climate and geology), a reacting force (soil and vegetation) that responds by circular conditioning to controlling forces, and at the lowest level, the stream which responds to all factors of the living system within its watershed.

PB81-108102 PC **A03**/MF **A01**
Florida Univ., Gainesville. Dept. of Coastal and Oceanographic Engineering.
Sikes Cut - Glossary of Inlets, Report No. 7,
T. A. Zeh. Aug 80, 45p FSG-35, NOAA-80090803
Grant NOAA-04-8-M01-76

The numerous inlets connecting Florida's inner waters to the Atlantic Ocean and the Gulf of Mexico are important from consideration of recreational and commercial vessel traffic. In addition, inlets act as flushing agents, providing renewal of bay waters by exchange with outer continental shelf waters. The complexities of the hydraulic and sediment transport mechanics in the vicinity of inlets present a formidable challenge to engineers and scientists. This report on Sikes Cut is one in a 'Glossary of Inlets' series whose purpose is to provide for each inlet a summary of the more significant available information and to list known documentation.

PB81-108409 PC **A07**/MF **A01**
Geological Survey, San Juan, PR. Water Resources Div.
Limnology of Lago Loiza, Puerto Rico.
Water-resources investigations (Final),
Ferdinand Quinones-Marquez. Feb 80, 131p USGS/WRD/WRI-80/055, USGS/WRI-79-97
Prepared in cooperation with the Commonwealth of Puerto Rico.

The principal chemical, physical and biological characteristics of Lago Loiza, Puerto Rico, and its main tributaries were studied from 1973-74. The lake supplies an average of 300,000 cubic meters per day of water to metropolitan San Juan. Flows from Rio Grande de Loiza and Rio Gurabo contribute 83.0 percent of the water, 67.4 percent of the nitrogen, and 65.7 percent of the phosphorus to the lake. About 31 percent of the nitrogen and 45 percent of the phosphorus were retained in the lake, which has a mean flushing rate of 19 times per year. The lake's capacity declines at a rate of about 1.9 percent per year and is about 14.9 million cubic meters. Lago Loiza is a hypereutrophic lake, with an average total nitrogen concentration of 1.7 milligrams per liter and 0.33 milligrams per liter of total phosphorus.

PB81-108904 PC **A08**/MF **A01**
Geological Survey, Lakewood, CO. Water Resources Div.
Analysis of Stream Quality in the Yampa River Basin, Colorado and Wyoming.
Water-resources investigations (Final),
Dennis A. Wentz, and Timothy Doak Steele. Apr 80, 170p USGS/WRD/WRI-80/049, USGS/WRI-80/08

Historic data show no significant water-temperature changes since 1951 for the Little Snake or Yampa Rivers. Trace-element and nutrient data collected from August 1975 through September 1976 at 92 sites in the Yampa River basin indicate that water-quality degradation occurred upstream from 3 sites. The degradation resulted from underground drainage from pyritic materials that probably are associated with coal at one site, discharge from powerplant cooling-tower blowdown water at a second site, and runoff from a small watershed containing a gas field at the third site. Ambient concentrations of dissolved and total iron and manganese frequently exceeded proposed Colorado water-quality standards. The concentrations of many dissolved and total trace elements and nutrients were greatest during March 1976.

PB81-109704 PC **A05**/MF **A01**
Arizona Water Resources Research Center, Tucson.
Hydrological and Environmental Controls on Water Management in Semiarid Urban Areas.
Rept. for Jul 69-Jun 72,
Sol Resnick, and K. J. DeCook. Sep 80, 77p W81-00006, OWRT-B-012-ARIZ(6)
Contract DI-14-31-0001-3056

Rainfall and runoff studies initiated in 1968 by the University of Arizona provide data for three small urban watersheds with different land use patterns in Tucson, Arizona. Initial field treatment and exploratory laboratory studies of treatment methods indicate that three days is an optimal length of time for detention storage of runoff, reducing average pollutant concentrations to 62 mg/l of turbidity, total coliform of 70-3200 organisms per 100 mg/l, and 7 mg/l of chemical oxygen demand. Simple laboratory treatment with alum and polyelectrolyte yielded an 80 percent reduction in COD, 90 percent reduction in bacterial loading, and appreciable clarification of the runoff samples.

PB81-109712 PC **A08**/MF **A01**
State Univ. of New York at Stony Brook. Marine Sciences Research Center.
Physical Hydrography of the Vienna Power Plant Site,
Donald W. Pritchard, and Robert E. Wilson. Jul 80, 155p SR-37, REF-80-4, PPSP/JHU/PPSE-8-10
Prepared in cooperation with John Hopkins Univ., Laurel, MD. Applied Physics Lab.

Part I of this report contains predictions of the distribution of thermal and chemical effluents in the Nanticoke River from existing Unit 8 and the proposed Unit 9. Predictions combined field thermal plume model, which combines a near field thermal plume model with a far field diffusion model. Part II contains computations of the distribution of contaminants which may be introduced into Chicone via the ground water.

PB81-109779 PC **A08**/MF **A01**
Georgia Inst. of Tech., Atlanta.
Methods of Low Flow Predictions for Small Georgia Streams,
James R. Wallace, Gerald N. Day, Walter Robert Howard, Jr., and Kurt J. Wiederkehr. Apr 80, 156p W81-00005, OWRT-B-130-GA(1)
Contract DI-14-34-0001-7114

Low flow in Georgia streams was estimated for use in determining waste assimilative capacity, the amount of oxygen-consuming waste that can be released into a stream without violating water quality standards. Low flow data are also needed for allocation of this resource during times of scarcity. Several approaches to the analysis and prediction of low flow were examined. The first used the concept of a deterministic watershed simulation model to estimate stream flow. The model developed was used to simulate six watersheds in Georgia.

PB81-112724 PC **A02**/MF **A01**
Arizona Univ., Tucson. Dept. of Civil Engineering.
Water Quality Transformations and Groundwater Recharge of Sewage Effluent Releases in an Ephemeral Stream Channel,
S. Ince, R. A. Phillips, and L. G. Wilson. Sep 80, 25p W81-00019, OWRT-A-051-ARIZ(2)
Contract DI-14-31-0001-5003

Bio-physicochemical measurements were made on treated sewage effluent releases at established locations within the channel of an ephemeral stream, the Santa Cruz River of Southern Arizona.

Water samples were taken in chronological sequence as the effluent moved downstream, to trace changes to quality parameters during low and high hydrograph stages. Results indicate that dissolved oxygen (DO) concentrations at low effluent flows were higher than DO concentrations at high effluent flows; while, conversely, biochemical oxygen demand (BOD) concentrations at low effluent flows were generally lower than BOD concentrations at high effluent flows. Biochemical oxygen demand concentrations are affected by waste loadings, flow conditions, phytoplankton growth and nitrification.

SKBF/KBS-TR-79-08 PC **A02**/MF **A01**
Kaernbraenslesaekerhet, Stockholm (Sweden).
Calculation of Ground Water Movements in the Sternoe Area in Blekinge, Sweden.
J. Stokes. Feb 79, 13p
In Swedish.
U.S. Sales Only.

The groundwater flow in the Sternoe region in Blekinge, Sweden was studied with the 2-D-analytical potential flow model which is presented in KBS report 47. Due to the topography, the cylinder-symmetrical alternative was used. Flowlines, gradients and flowtimes were computed for four different profiles representing typical examples of boundary conditions. The flowlines, gradients and flowtimes are presented in figures. (Atomindex citation 11:511491)

SKBF/KBS-TR-79-17 PC **A02**/MF **A01**
Svensk Kaernbraenslefoersoerjning AB, Stockholm.
Water Percolation Effects on Clay-Poor Bentonite/Quartz Buffer Material at High Hydraulic Gradients.
R. Pusch. May 79, 13p
U.S. Sales Only.

A test senes was made in the laboratory to investigate the clay-transporting power of percolating water. Two buffer mass compositions were studied, one containing 4 percent Na bentonite and 96 percent quartz particles the other 8 percent bentonite and 92 percent quartz. (Atomindex citation 11:511485)

8I. Mining Engineering

PB81-104523 PC **A06**/MF **A01**
Bureau of Mines, Denver, CO. Intermountain Field Operations Center.
Valuation of Potash Occurrences Within the Nuclear Waste Isolation Pilot Plant Site in Southeastern New Mexico.
Information circular/1980,
Robert C. Weisner, Jim F. Lemons, Jr., and Luis V. Coppa. 1980, 108p BUMINES-IC-8814

Current production costs and market conditions in the potash industry of the Carlsbad area were studied to determine the potential values of the potash mineral resource that would be lost or foregone if the Waste Isolation Pilot Plant (WIPP) facility is constructed on the proposed site in that area. The purpose of the WIPP project is to investigate the possibility of developing a nuclear waste disposal plant in the salt formations at the site. Analyses were made of all potash deposits determined to be in the site. Mining and processing under the most favorable recovery systems were considered. Value determinations were based upon estimated operating and capital costs of current mine-mill operations in the Carlsbad area.

PB81-104747 PC **A05**/MF **A01**
Hampton (Delon) and Associates, Silver Spring, MD.
The Environmental Impact of Coal Transfer and Terminal Operations.
Final rept. Dec 78-Dec 79,
L. Pelham, L. A. Abron-Robinson, M. Ramanathan, and D. Zimmora. Oct 80, 88p EPA-600/7-80-169

This study was conducted to assess current environmental impacts, and to define potential control technology that will minimize the pollution resulting from coal transfer/terminal operations. Environmental impacts from coal transfer/terminal operations can be lessened by employing proper control methods, which should be incorporated into the early states of planning and design. Coal transfer is an expanding technology, and the construction, operation, and closure/abandoment of new transfer facilities should be monitored and reported. In addition, experiences related to the transfer of western coals should be monitored and reported, since a limited amount of experience has been reported on the handling of these coals.

PB81-105116 PC **A13**/MF **A01**
Dames and Moore, Anchorage, AK.
Alaska OCS Socioeconomic Studies Program. Technical report no. 56. St. George Basin Petroleum Technology Assessment.
Final rept.,
Peter T. Hanley, William W. Wade, and Marvin F. Feldman. Aug 80, 299p 8699-023-20, BLM/YK-TR-80/17
Contract DI-AA851-CTO-3

This report identifies the petroleum technology that may be used to develop the oil and gas resources of the St. George Basin OCS Lease Sale No. 70. The analysis focuses on both the individual field development components (types of platforms, pipelines, etc.) and the overall development strategies.

PB81-105280 PC **A04**/MF **A01**
Bureau of Mines, Denver, CO. Minerals Availability Field Office.
Supply Analysis Model (SAM): A Minerals Availability System Methodology.
Information circular,
Robert L. Davidoff. 1980, 52p BUMINES-IC-8820

Growing domestic and global demands for mineral resources have established an imperative need for developing comprehensive, versatile mineral supply analysis evaluation tools. The Minerals Availability System (MAS) of the Bureau of Mines is meeting this need with its computerized Supply Analysis Model (SAM). This paper describes the SAM system and the quantitative methods used by the MAS for mineral supply analyses. The MAS evaluating process consists of deposit identification, tonnage and grade determinations, engineering and cost evaluations, financial analyses, and supply curve generation. MAS has developed this computerized system primarily to facilitate the maintenance of data information for the constructing of commodity supply curves. The SAM system presently has the analytical capabilities of simultaneously (1) evaluating many mineral deposits, (2) updating mineral supply information to reflect inflationary changes in costs and prices, and, (3) conducting sensitivity analysis to determine impacts on mineral supply under various conditions. Many potential users in both government and industry will find the SAM system a valuable tool for policy analysis, forecasting, and planning. The SAM system has been constructed so that any types of information that are similar to the data elements in the MAS data base may be used to perform supply studies. The storage space needed for the SAM system's programs, files, and output data is approximately 14 million characters.

PB81-105827 PC **A11**/MF **A01**
State Univ. of New York at Buffalo. Dept. of Civil Engineering.
Water Quality Modelling of Mine Acid Drainage.
Water resources and environmental engineering research rept. (Interim),
Akira Uchida. Aug 79, 228p SUNYBUF/WREE-79-06
Grant NSF-ENG77-15365

Two steady-state, one-dimensional water quality models applicable to the streams receiving mine drainages are presented. The first model assumes chemical characteristics of the stream waters to be represented by the system of aqueous carbonate-sulfate equilibria. The exchange of carbon dioxide across the air-water interface was assumed to be the only significant sink-source of inorganic carbon. Essential aspects of the model were tested in a bench-scale laboratory experiment. A comprehensive model is then presented which takes into consideration kinetics of ferrous iron oxidation, growth and decay of iron-oxidizing bacteria, and interfacial exchanges of oxygen ad carbon dioxide, as well as chemical precipitation-dissolution reactions. The aqueous chemical system is modelled for forty-two species that are commonly present in mine drainage waters.

PB81-109415 PC **A16**/MF **A01**
Pennsylvania State Univ., University Park. Dept. of Mineral Engineering.
User's Manual for Premining Planning of Eastern Surface Coal Mining. Volume 2. Surface Mine Engineering.
Final rept. Jun 75-Jul 78,
R. V. Ramani, C. J. Bise, C. Murray, and L. W. Saperstein. Oct 80, 374p EPA-600/7-80-175
Grant EPA-R-803882
See also Volume 1, PB-287 086.

A comprehensive summary of the analyses required to layout a surface mine, taking into consideration the limitations imposed by geology, equipment, reclamation, economics, and environmental control requirements is provided. Methods, techniques, and alternatives are recommended for selecting and designing mining systems that include soil handling and storage, overburden removal, and minimization of environmental effects of drilling, blasting, off-highway transportation, coal loading, and steep slopes.

8J. Physical Oceanography

AD-A089 288/5 PC **A04**/MF **A01**
Calspan Advanced Technology Center Buffalo NY
The Microphysics and Chemistry of Sea Spray and Marine Aerosols in the Northern Gulf of Mexico.
Final rept.,
C. K. Akers, and E. J. Mack. Aug 80, 65p Rept no. CALSPAN-6438-M-1
Contract N00014-79-C-0033

The microphysics and chemistry of sea spray and aerosol in the lower marine boundary layer were evaluated at the NCSC 'STAGE I' platform offshore from Panama City, Florida. The results of this program are presented in the form of a technical papers (one to be published and two presented at meetings). (Author)

AD-A089 459/2 PC **A05**/MF **A01**
Naval Oceanographic Office NSTL Station MS
Indian Ocean Geological, Geophysical and Oceanographic Data Catalog, USNS WILKES, 1977-1979.
Rept. for May 77-Dec 79,
Luther Little, Nicholas J. DiPiazza, William J. Vestal, and William P. Searcy, III. Aug 80, 80p Rept no. NOO-RP-30

During the period of May 1977 to December 1979, the U.S. Naval Oceanographic Office conducted geological, geophysical, and oceanographic surveys in the Indian Ocean from the USNS WILKES. The report summarizes the type, amount, and location of underway and on-station data. Underway data consists of seismic profiles, narrow beam bathymetry, 3.5 kHz subbottom profiles, total magnetic intensity, and sea surface temperature measurements. On-station data includes sediment interval velocity measurements made by using wide angle bottom reflectivity techniques, bottom sediment cores and oceanographic stations. (Author)

PB81-108581 PC **A02**
National Environmental Satellite Service, Washington, DC.
Regular Monthly Mean Temperatures of Earth's Oceans from Satellites,
A. E. Strong, and J. A. Pritchard. Jun 80, 8p NOAA-80090914
Pub. in Bulletin of American Meteorological Society, v61 n6 p553-559 Jun 80.

Comparisons of satellite-derived monthly mean sea surface temperature anomalies with National Marine Fisheries Service (NMFS) ship-derived monthly mean sea surface temperature anomalies over the North Pacific Ocean reveal some encour-

aging results. Although still far from perfect, correlation coefficients for linear fits of 0.34, 0.49, 0.50, and 0.55 are observed for the winter months of November 1977, December 1977, January 1978, and February 1978, respectively. The standard error of estimate remained close to + or - 0.6C and the satellite-ship temperature difference between the overall monthly mean anomaly vacillated between +0.31C (December 1977) and -0.30C (February 1978). Several other comparisons are presented.

8K. Seismology

AD-A089 225/7 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory Palisades NY
Elementary Solutions to Lamb's Problem for a Point Source and Their Relevance to Three-Dimensional Studies of Spontaneous Crack Propagation,
Paul G. Richards. 2 Nov 78, 12p LDGO-2835, AFOSR-TR-80-0650
Contract F49620-77-C-0098, ARPA Order-3291
Pub. in Bulletin of the Seismological Society of America, v69 n4 p947-956 Aug 79.

No abstract available.

AD-A089 512/8 PC **A08**/MF **A01**
Atomic Weapons Research Establishment Aldermaston (England)
The 1976 Earthquake Sequence in Uzbekistan - Focal Mechanisms Determined Using the Relative Amplitude Method,
R. G. Pearce, Hilary Bainbridge, Pamela F. Key, and J. B. Young. Jul 80, 173p AWRE-027/80, DRIC-BR-74998

The relative amplitude method of determining earthquake source orientations is applied to short period teleseismic array observations of the 1976 Uzbekistan earthquake sequence. Many of these events are shown to be consistent with a double couple source, and the method provides well determined orientations for most events with magnitude m(b) between 4.0 and 5.6. (Author)

AD-A089 683/7 PC **A03**/MF **A01**
Cooperative Inst for Research in Environmental Science Boulder CO
Earthquake Characteristics and Earthquake-Explosion Discrimination.
Rept. no. 8 (Final) 1 May-31 Oct 78,
Charles B. Archambeau, Vernon F. Cormier, C. Kisslinger, and G. Lundquist. 1979, 34p AFOSR-TR-79-0451
Grant AFOSR-75-2775, ARPA Order-3291
Supersedes AD-A067 368.

Waveform modeling at distances less than 40 degrees can predict the large effects that both rapid velocity variation and anelasticity have on the waveforms of seismic body waves. Because the effects of non-planar layers, lateral heterogeneity, and the frequency dependence of the radiation pattern of the source all become more difficult to predict as the wavelength of seismic radiation decreases; waveform modeling has generally been more successful at longer periods of seismic radiation (100-10 sec.) than shorter periods (5- .1 sec). Earth models derived from the study of body waves of long period are nonetheless valuable in providing simple starting models for the study of short period data valuable to the seismic discrimination problem. One such long period model, T7, for P wave velocity in western North America has been given recently by Burdick and Helmberger (1978). In extending the full wave theory summarized in previous technical reports (Cormier, 1978, 1977) to practical earth models for P waves, we have begun by examining the theory's waveform predictions for the T7 model compared to the predictions given by the Cagniard-de Hoop method of synthesis used by Burdick and Helmberger. In completing this comparison we hope to (1) resolve whether the assumption of primary ray multiples in the Cagniard-de Hoop method, which has been shown to be a problem for body waves interacting with a strong velocity discontinuity such as the core-mantle boundary (Cormier and Ruff, 1978), is inadequate near weak velocity discontinuities postulated for the earth's mantle and to demonstrate the applicability and efficiency of the full wave theory to regions of complicated ray interactions.

NUREG/CR-1457 PC **A04**/MF **A01**
Lawrence Livermore National Lab., CA.
Regional Relationships Among Earthquake Magnitude Scales; Seismic Safety Margins Research Program.
Technical rept.,
D. H. Chung, and D. L. Bernreuter. Sep 80, 54p UCRL-52745

The seismic body-wave magnitude mb of an earthquake is strongly affected by regional variations in the Q structure, composition, and physical state within the earth. Therefore, because of differences in attenuation of P-waves between the western and eastern United States, a problem arises when comparing mb's for the two regions. A regional mb magnitude bias exists which, depending on where the earthquake occurs and where the P-waves are recorded, can lead to magnitude errors as large as one-third unit. There is also a significant difference between mb and ML values for earthquakes in the western United States. An empirical link between the mb of an eastern U.S. earthquake and the ML of an equivalent western earthquake is given by ML = 0.57 + 0.92(mb) East. This result is important when comparing ground motion between the two regions and for choosing a set of real western U.S. earthquake records to represent eastern earthquakes.

NUREG/CR-1637 PC **A03**/MF **A01**
Canadian Commercial Corp., Ottawa (Ontario).
Canadian Seismic Agreement.
Annual rept. Jun 79-Jun 80,
R. B. Hayman, and R. J. Wetmiller. Sep 80, 42p
Contract NRC-04-79-180

This is the second annual progress report under terms of Contract No. NRC-04-79-180. This report gives the details of the developments during the first year of this agreement and plans for the expansion of the Eastern Canadian Telemetered Network during the coming year. This includes a detailed description of the entire seismograph system, i.e., sensors, A/D conversion, modes of telemetry, etc. Also included are the descriptions of the present and proposed station deployment.

NUREG/CR-1639 PC **A07**/MF **A01**
Shannon and Wilson, Inc./Agbabian Associates, Seattle, WA.
Site-Dependent Effects at Strong-Motion Accelerograph Stations.
Technical rept.
Sep 80, 146p
Contract NRC-04-76-200

This study consists of an assessment of a six-step procedure that comprises site-dependent and site-independent methods for developing seismic input criteria at sites of nuclear plants and other major structures. The assessment was based on an application of the procedure at three accelerograph sites in California; Fernadale, El Centro, and Taft, where strong earthquake motions have been recorded and where subsurface soil properties have been measured by the SW-AA joint venture. At each of these sites, reference earthquake events were identified which correspond to magnitudes and distances identical to those for which strong ground motions had been recorded. The various site-dependent and site-independent techniques were then used to predict ground motions corresponding to these events. Comparisons between the recorded and predicted earthquake motions served as a basis for assessing the adequacy of the procedure. These comparisons showed that the six-step procedure provided reasonable estimates of the recorded motions, although no single site-dependent or site-independent method comprised by the procedure was superior in all cases.

NUREG/CR-1649 PC **A12**/MF **A01**
Michigan Univ., Ann Arbor.
Geophysical Investigations of the Anna, Ohio Earthquake Zone.
Annual progess rept. Jul 79-Jun 80,
F. J. Mauk, S. G. Henry, D. H. Christensen, J. Sauber, and C. Lanford. Sep 80, 265p
Contract NRC-04-76-192
See also NUREG-CR-1065.

This report discusses the progress and achievements accomplished under NRC Contract No. NCR-04-76-192 during fiscal year 1980. The Anna, Ohio seismic array, converted to solar recharge power systems, has been in continuous operation. No local earthquakes above m sub b 1.5 have occurred. Near regional earthquakes from 1977 through 1980 supplemented with quarry blast recordings have been used to determine the regional travel time curves. Theoretical estimates of earthquake detection and location capabilities for m sub b 2.5, 2.0, and 1.5 earthquakes in the Anna, Ohio region are included to demonstrate the coverage effectiveness of the network. Teleseismic P-wave residuals as a function of azimuth are included to demonstrate the lower crustal velocity variation for the region. Finally, an exhaustive catalog of water and gas well data is included from which a regional depth to bedrock map has been produced.

NUREG/CR-1660 PC **A07**/MF **A01**
Lawrence Livermore National Lab., CA.
Compilation, Assessment and Expansion of the Strong Earthquake Ground Motion Data Base. Seismic Safety Margins Research Program (SSMRP).
Technical rept.,
C. B. Crouse, J. A. Hileman, B. E. Turner, and G. R. Martin. Sep 80, 147p UCRL-15227

A catalog has been prepared which contains information for: (1) world-wide, ground-motion accelerograms, (2) the accelerograph sites where these records were obtained, and (3) the seismological parameters of the causative earthquakes. The catalog is limited to data for those accelerograms which have been digitized and published. In addition, the quality and completeness of these data are assessed. This catalog is unique because it is the only publication which contains comprehensive information on the recording conditions of all known digitized accelerograms. However, information for many accelerograms is missing. Although some literature may have been overlooked, most of the missing data has not been published. Nevertheless, the catalog provides a convenient reference and useful tool for earthquake engineering research and applications.

PB81-103806 PC **A06**/MF **A01**
Geological Survey, Menlo Park, CA. Seismic Engineering Branch.
Western Hemisphere Strong-Motion Accelerograph Station List, 1976.
Preliminary rept.
May 77, 114p OPEN FILE-77-374, NSF/RA-770910

This list contains information on strong-motion stations installed in the Western Hemisphere for which there is some data in the files of the U.S. Geological Survey. It is intended to provide an indication of the status of the networks as of March 1977. The numbering of the stations is based on their regional locations. Stations are arranged by country, north to south, by states in the section for the United States, and then alphabetically by station name. The station name is that which is believed to be the most commonly used name. Prominent facilities, such as dams, pumping plants, and reservoirs, are listed under the name of the facility. Buildings are listed under the city in which they are located and then either under the name of the building or the street address. All names that have been used on past records are cross-referenced to presently used names. The practice of numbering only the instrument station has replaced the former practice of numbering each individual instrument location. Only one number is assigned to a structure such as a building, bridge, or dam although there may be several instruments or many acceleration sensors installed at various locations in and near the structure. The brief site descriptions represent an interpretation of the conditions at each station based on data presently in the stations files.

8L. Snow, Ice, and Permafrost

AD-A089 674/6 PC **A08**/MF **A01**
Cold Regions Research and Engineering Lab Hanover NH
Working Group on Ice Forces on Structures. A State-of-the-Art Report.
Special rept.,
Torkild Carstens. Jun 80, 153p Rept no. CRREL-SR-80-26

A short review is presented of the literature on thermal ice pressure against extended hydraulic structures such as dams. Some of the methods suggested for the computation of ice loads caused by temperature changes are reviewed. As a means of comparison measurements of thermal ice pressure and empirical values used at present for estimating these loads are referred to. Ice forces on structures are determined either by the environmental driving force or by the force to fail the ice sheet and move the ice around the structure; which ever is the least. State-of-the-art techniques for predicting these forces on fixed, rigid structures are presented. The modes of interaction between ice and structure are discussed, and the properties of both ice and structure are seen in the context of interaction. The key parameter of the ice is the dependence of crushing strength on loading rate, in particular the inverse relationship that exists for a certain range and gives rise to negative damping. A review of the buckling analyses of floating ice sheets is presented. The theory used is that of a beam or plate on an elastic foundation.

PB81-106643 PC **A02**/MF **A01**
Washington Univ., Seattle. Dept. of Oceanography.
The Use of SEASAT (SMMR) Imagery to Study the Bering Sea Ice.
Interim rept.,
Seelye Martin. 1 Jul 80, 22p REF-A80-21, NOAA-80090806
Contract MO-A01-78-00-4335

Some of the thickest ice in the Bering Sea occurs at its edge. The movement of this thick ice by winds and currents represents a potential hazard to any future drilling operations in lease areas such as the Navarin Basin and Bristol Bay. The high productivity of the ice edge may in part be caused by upwelling driven by the observed open nature of the edge; also, the knowledge of the ice edge properties and ability to forecast the edge position is essential to the safety of fishing boats operating near the edge. In both hemispheres the position of the ice edge is an important input to any numerical climate model. It was observed that the ice divides into three general types moving in from the pack edge. The cause of these three different zones appears to be the ocean swell. This means that when the wind blows from the north, the increased surface roughness causes greater atmospheric drag and the roughened ice is blown away from the pack, where it forms the observed ice bands.

8M. Soil Mechanics

AD-A089 621/7 PC **A08**/MF **A01**
New Mexico Univ Albuquerque Dept of Geology
Properties and Prediction of Caliche in Alluvial Basins of the Southwestern United States. Applied to Siting and Engineering of the Multiple Aim Point Missile System.
Final rept. 1 Mar 78-31 Mar 79,
Stephen G. Wells, and Jerald D. Schultz. Jul 80, 174p AFOSR-TR-80-0747
Grant AFOSR-78-3572

Four major study areas were selected to carry out detailed field and laboratory investigations of calcium carbonate cementation. These four study areas include: (1) selected alluvial basins in the southern Basin and Range Province of Arizona. Major characteristics include low-carbonate parent material, open but poorly integrated basins, tectonic stability, areas of active aggradation, and wide variations in alluvium texture; (2) Selected alluvial basins along the Colorado River in western Arizona. Major characteristics include high-carbonate parent material, open drainage basins, active dissection, and coarse-grained alluvium; (3) The Las Vegas alluvial basins in southern Nevada. Major characteristics include high-carbonate parent material, numerous geomorphic surface, open and closed drainage basins, and variable textures of alluvium; and (4) Selected basins in central Nevada. Major characteristics include variable carbonate content in parent materials, tectonically active, closed and open basins, and variable textures of parent materials.

AD-A089 676/1 PC **A03**/MF **A01**
Cold Regions Research and Engineering Lab Hanover NH
Dynamic Testing of Free Field Stress Gages in Frozen Soil.
Special rept.,
George W. Aitken, Donald G. Albert, and Paul W. Richmond. Jul 80, 30p Rept no. CRREL-SR-80-30

This report describes an attempt to develop a procedure for dynamic calibration of free-filled soil stresses gages embedded in a soil sample. The method presented utilizes a drop-type impact testing machine and a small, instrumented container of soil. The velocity history of a shock pulse applied to the soil sample is measured and the applied stress computed; this value is then compared with data obtained from stress gages embedded in the soil. The results showed that the procedure is adequate for unfrozen soil, but for frozen soil the accuracy in the measurement of compressional wave velocity needs to be increased to obtain useful results. (Author)

PB81-100661 PC **A14**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Sea Grant Coll. Program.
Pore Pressure During Cone Penetration in Clays,
Jacques-Noel Levadoux, and Mohsen M. Baligh. Apr 80, 313p MITSG-80-12, NOAA-80082505
Grant NA79AA-D-00101

Deep quasi-static cone penetration provides a superior exploration tool for soil stratification and identification, especially in offshore work. This report utilizes the strain path method to investigate the mechanism of cone penetration in clays with the specific objective of estimating pore pressures in the soil during penetration. Deformations and strains are determined assuming that the soil provides no shearing resistance. Deviatoric stresses and shear-induced pore pressures are determined from specially developed soil behavior models and the strain paths of soil elements. Approximate values of the total stresses and pore pressures in the soil are then computed from equilibrium considerations. An evaluation of the predicted pore pressure fields in Boston Blue Clay are given in the report.

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A089 189/5 PC **A04**/MF **A01**
TRW Defense and Space Systems Group Redondo Beach CA
The Hardening of Satellite Cables to X-Rays.
Final rept. 18 Jan-30 Nov 77,
David M. Clement, and Robert A. Lowell. 28 Feb 78, 53p DNA-4540F, AD-E300 908
Contract DNA001-77-C-0084

Several classes of satellite cables are irradiated in SPIRE Corporation's SPI-PULSE 6000 X-Ray facility in order to identify hardening techniques for cables, and to verify computer models of the X-Ray induced response of cables (MCCABE code). The following techniques for hardening cables are shown to be effective: (1) filling the voids between conductors and insulation; (2) employing coaxial cables rather than cable bundles; (3) reducing the atomic numbers of the conductor materials; (4) using conductive plastic coatings between conductors and insulation. The following techniques for hardening cables was found to be ineffective: matching atomic numbers between conductors and insulation. Model results generally agreed in sign with experiment. The predicted magnitude of response ranged from an order-of-magnitude too low, to essential agreement within experimental error, depending on how well the voids between conductors and insulation were defined. (Author)

AD-A089 232/3 PC **A02**/MF **A01**
Rensselaer Polytechnic Inst Troy NY Dept of Electrical and Systems Engineering
Multiple Buried Channel Charge-Coupled Device.
Technical rept.,
S. N. Chakravarti, and P. Das. 17 Aug 79, 9p
Rept no. MA-ONR-36
Contract N00014-75-C-0772
Pub. in Solid-State Electronics, v23 p747-753 1980.

No abstract available.

AD-A089 299/2 PC **A04**/MF **A01**
Civil Engineering Lab (Navy) Port Hueneme CA
Solid State Transformer Concept Development.
Final rept. Oct 78-Sep 79,
James L. Brooks. Apr 80, 51p Rept no. CEL-TN-1575

This report describes an effort made to determine the feasibility of developing a circuit using power semiconductor devices to duplicate the function of the power transformer. A circuit concept has been developed which duplicates the primary function of voltage stepup/stepdown but does not demonstrate the DC isolation characteristic of normal transformers. Several characteristics of the circuit appear very attractive, such as increased voltage regulation and relatively high efficiency. (Author)

AD-A089 410/5 PC **A04**/MF **A01**
Rensselaer Polytechnic Inst Troy NY Dept of Electrical and Systems Engineering
Radiation Effects on the Microwave Properties of GaAs MESFETs.
Final technical rept. 1 Apr 78-30 Jun 79,
Jose M. Borrego, Ronald J. Gutmann, Sanjay B. Moghe, and Kevin G. Rochford. Jun 80, 71p
RADC-TR-80-171
Contract F19628-78-C-0097

The effect of fast neutron and gamma irradiation on the electrical characteristics of low noise microwave GaAs MESFET amplifiers has been evaluated. The microwave amplifiers were realized on alumina microstrip using commercial devices mounted in a common source configuration. The changes in the noise figure and amplifier gain at S- and X-band were determined for neutron fluences between 3 x 10 to the 12th power to 1 x 10 to the 15th power n/sq cm and for a gamma dose of 2 x 10 to the 7th power rads (Si). The noise figure starts to be affected at 10 to the 14th power n/sq cm and a large deterioration is observed at 1 x 10 to the 15th power n/sq cm. The increase in noise figure is related to the decrease in transconductance and increase in the parasitic source resistance. The decrease in the amplifier gain at the high neutron fluence is due to a deterioration of the transconductance, source resistance and change in the gate to source and gate to drain capacitances. The low frequency noise increases with neutron radiation but not with gamma-radiation. The low frequency noise appears not to be correlated with the microwave noise. Gamma irradiation increases the noise figure at a dose of 2 x 10 to the 7th power rads (Si) without affecting the signal characteristics of the device. It appears that Gamma-radiation produces levels which respond at microwave frequencies.

Group 9A—Components

AD-A089 449/3 PC **A03**/MF **A01**
South Carolina Univ Columbia Dept of Mathematics and Statistics
Global Nonexistence of Smooth Electric Induction Fields in One-Dimensional Nonlinear Dielectrics.
Interim rept.,
Frederick Bloom. 1980, 38p AFOSR-TR-80-0935
Grant AFOSR-77-3396

Coupled nonlinear wave equations are derived for the evolution of the components of the electric induction field D in a class of rigid nonlinear dielectrics governed by the nonlinear constitutive relation E = lambda (D)D, where E is the electric field and lambda greater than 0 is a scalar-valued vector function. For the special case of a finite one-dimensional dielectric rod, embedded in a perfect conductor, and subjected to an applied electric field, which is perpendicular to the axis of the rod, and depends only on variations of the coordinate along that axis, it is shown that, under relatively mild conditions on lambda, solutions of the corresponding initial-boundary value problem for the electric induction field can not exist globally in time in the L(2) sense; under slightly stronger assumptions on the constitutive function lambda, a standard Riemann Invariant argument may be applied to show that the space-time gradient of the non-zero component of the electric induction field must blow-up in finite time. Some growth estimates for solutions, which are valid on the maximal time-interval of existence are also derived.

AD-A089 477/4 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Microwave Emission from Pulsed, Relativistic e-Beam Diodes. II. The Multiresonator Magnetron,
A. Palevsky, and G. Bekefi. 22 Aug 78, 12p
AFOSR-TR-80-0772
Grant AFOSR-77-3143
Pub. in The Physics of Fluids, v22 n5 p986-996 May 79. See also AD-A088 693.

No abstract available.

N80-31732/4 PC **A08**/MF **A01**
RCA Labs., Princeton, NJ. Microwave Technology Center.
Ku-Band Field-Effect Power Transistors.
Final Report, 9 Nov. 1977 - 8 Aug. 1979.
G. C. Taylor, and H. C. Huang. Sep 79, 152p
NASA-CR-160010, PRRL-79-CR-39
Contract NAS5-24355

A single stage amplifier was developed using an 8 gate, 1200 micrometer width device to give a gain of 3.3 + or - 0.1 dB over the 14.4 to 15.4 GHz band with an output power of 0.48 W and 15% minimum efficiency with 0.255 W of input power. With two 8 gate devices combined and matched on the device carrier, using a lumped element format, a gain of 3 dB was attained over the 14.5 to 15.5 GHz band with a maximum efficiency of 9.9% for an output power of 0.8 W.

PAT-APPL-6-118 043 PC **A02**/MF **A01**
Department of the Navy Washington DC
Electrical Connection.
Patent Application,
William R. Scott, William T. Weist, Karen M. McMahon, and Phillip Bloomfield. Filed 4 Feb 80, 25p AD-D007 459/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A mechanical and electrical connection for a piezoelectric member of polymeric material such as polyvinylidene fluoride, and method for forming such a connection. To form the connection, the piezoelectric member is first masked to prevent a preselected portion of its surface from being coated during subsequent coating operations. An electrically conductive member such as a lead wire or a solderable terminal is then attached to the nonmasked area of the piezoelectric member with adhesive such as epoxy. The masked piezoelectric member, the electrically conductive member, and (incidentally) the mask are then coated with a conductive coating such as sputtered gold to electrically connect the conductive member to the piezoelectric member. The mask can now be removed from the piezoelectric member if desired, although it can be left in place as a convenient vise. If the conductive member is a wire, adjacent portions of the wire and the piezoelectric member can now be coated with additional epoxy to provide heat dissipation for and protect the electrical connection provided by the conductive coating, and to insure mechanical strength of the contact. If the conductive member is a terminal strip or solderable terminal, a wire can now be soldered to the conductive coating at the terminal using low temperature solder. The solder joint can then be coated with silver-filled paint to oroduce a lower current density and lower contact resistance in the vicinity of the contact. (Author)

PATENT-4 200 821
Not available NTIS
Department of Energy, Washington, DC.
Relativistic Electron Beam Crossed-Field Device.
Patent,
G. Bekefi, and T. J. Orzechowski. Filed 17 Mar 77, patented 29 Apr 80, 6p PAT-APPL-778 392 Supersedes PAT-APPL-778 392-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An intense relativistic crossed field device in a nested configuration wherein a field emission cathode is nested within a segmented annular anode with an annular gap separating the two. (ERA citation 05:034242)

PATENT-4 213 168
Not available NTIS
Department of the Air Force Washington DC
Electret Charge Technique.
Patent,
Matthew G. Garbett. Filed 20 Jul 78, patented 15 Jul 80, 5p AD-D007 442/7, PAT-APPL-926 360 Supersedes PAT-APPL-926 360-78, AD-D005 284.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A dielectric tape of FEP (polyfluoroethylenepropylene) Teflon is electrostatically charged to a high level charge density using a motor driven capstan on which the tape is moved at a controlled velocity past a sponge assembly charged by a high DC voltage. The sponge assembly is wetted with a dielectric fluid mixture of methyl alcohol, ethyl alcohol and acetone. By endosmosis, a bead of fluid forms between the sponge and the FEP Teflon tape causing the fluid to be evenly distributed on the tape. An air blower directed onto the surface of the tape drys the tape as it passes by. (Author)

PB81-106544
(Order as PB81-106536, PC **A05**/MF **A01**)
National Bureau of Standards, Washington, DC. National Measurement Lab.
A Proposed Coil System for the Improved Realization of the Absolute Ampere,
P. T. Olsen, W. D. Phillips, and E. R. Williams. 1 Apr 80, 16p
Included in Jnl. of Research on the National Bureau of Standards, v85 n4 p257-272 Jul-Aug 80.

In order to resolve the discrepancies which presently exist between the directly measured values of the absolute or SI ampere and the calculated values obtained indirectly from other fundamental physical constant determinations, one must design an absolute ampere experiment which will produce a result with an uncertainty of one half part per million or less. A new approach recently proposed by Kibble promises such sub-ppm accuracy. Presented here is the design and evaluation of a coil system which will fulfill the requirements of this new approach.

9B. Computers

AD-A089 153/1 PC **A05**/MF **A01**
Institute for Defense Analyses Arlington VA Science and Technolcgy Div
Data Base Access in Communications, Command, Control and Intelligence Computer Networks.
Final rept. Feb 79-Feb 80,
Thomas C. Bartee, and O. Peter Buneman. Jun 80, 94p IDA-P-1489, IDA/HQ-80-22364, AD-E500 200
Contract MDA903-79-C-0320

Shared resources in C3I systems require either standard query languages or translators. A standard for C3I data base structures is needed to facilitate future system developments. The transmission control protocol is advancing and front ends are required for system usage.

AD-A089 173/9 PC **A06**/MF **A01**
Massachusetts Univ Amherst Dept of Computer and Information Science
Edge Relaxation and Boundary Continuity.
Technical rept.,
Allen R. Hanson, Edward M. Riseman, and Frank C. Glazer. May 80, 113p Rept no. COINS-TR-80-11
Contract N00014-75-C-0459, Grant NSF-MCS79-18209

Many image analysis tasks require the construction of a boundary representation as a means of partitioning an image. This paper develops a parallel relaxation algorithm for updating initial heuristic estimates of the likelihood of edges so that continuous boundaries are formed. Bayesian probability theory is used to analyze the probability updating of a single edge based upon the joint probabilities of the edges in its local surrounding context. The relationships between edges, sometimes referred to as compatibility coefficients in relaxation algorithms, are embodied as conditional probabilities between the central edge and the context of edges. The set of conditional probabilities are theoretically derived from a model of desired line drawings that satisfy basic notions of boundary continuity. The local updating function attempts to drive the likelihood of each central edge into consistency with the surrounding context. Experiments involving the iterative parallel application of this non-linear Bayesian updating function to all edge probabilities demonstrates serious problems in the formulation. A variety of heuristic modifications, guided by theoretical considerations, are examined empirically. The final formulation is an algorithm that performs in an effective manner on several very complex images. (Author)

AD-A089 178/8 PC **A04**/MF **A01**
Computer Corp of America Cambridge MA
The Enhancement of Datamodule I.
Final technical rept.
1980, 69p
Contract N00039-78-C-0443, ARPA Order-3175

This report summarizes a project entitled 'The Enhancement of Datamodule 1.' The focus of this project is to study the Datacomputer's (MARILL and STERN) performance in its role as a datamodule in SDD-1 and as a DBMS in other command and control applications. The goal of this study is to produce a set of potential performance enhancements and an analysis of their expected effect on overall Datacomputer performance. Some of the proposed enhancements would be subsequently implemented in the Datacomputer. During the reporting period, the model of Datacomputer performance constructed previously during this project was used to analyze performance in the Advanced Command and Control Architecture Testbed (ACCAT). The Datacomputer was instrumented to produce extensive performance data at runtime. The results of this work have indicated which parts of the system are bottlenecks and this, in turn, is suggesting potential enhancements. In addition, the instrumented Datacomputer has been used in other performance work for ARPA.

AD-A089 195/2 PC **A03**/MF **A01**
Colorado Univ At Boulder Dept of Computer Science

A Precise and Efficient Algorithm for Determining Existential Summary Data Flow Information,
Eugene W. Myers. Mar 80, 38p CU-CS-175-80, ARO-17124.2-M
Contract DAAG29-80-C-0094, Grant NSF-MCS77-02194

Data flow analysis is well understood at the intra-procedural level and efficient algorithms are available. When inter-procedural mechanisms such as recursion, procedure nesting, and pass-by-reference parameters are introduced, the data flow problems become more difficult. Let ISIZE be the size of the problem and OSIZE be the size of the resulting data flow relation. A O(ISIZE + OSIZE) algorithm is demonstrated for the existential summary data flow problem. (Author)

AD-A089 209/1 PC **A04**/MF **A01**
Colorado Univ At Boulder Dept of Computer Science
FLAT: A FORTRAN Language Augmentation Tool,
Leon J. Osterweil, and Eugene W. Myers, Jr. Jul 80, 62p CU-CS-179-80, ARO-17124.1-M
Contract DAAG29-80-C-0094, Grant NSF-MCS77-02194

This paper describes the motivation, design, implementation, and some preliminary performance characteristics of FLAT, a macro definition capability for creating language enhancors and translators. FLAT enables the user to specify transformations through STREX, a FORTRAN-like language, which enables the specification of macros which are then used to interpretively alter incoming programs. FLAT is specially adapted to the processing of FORTRAN programs. This paper shows how it can be used as a deprocedurizer (or flattener), a dialect-to-dialect translator, a portability and version control aid, and a device for creating language enhancements as sophisticated as new control structures and abstract data types. (Author)

AD-A089 271/1 PC **A03**/MF **A01**
Royal Signals and Radar Establishment Malvern (England)
An Overview of Reliable Computer System Design,
J. A. McDermid. May 80, 30p RSRE-80003, DRIC-BR-75035

This paper was produced to support a series of lectures on reliable computer system design on multiple processor computers. The paper presents an overview of reliable computer system design. It attempts to provide a pragmatic guide to redundancy and recovery, but does not give a very thorough discussion of either the theory or philosophy of reliable systems. The paper introduces and defines the basic concepts of reliability, and describes the basic mechanisms for achieving fault tolerance. It compares the attributes of multi processor and multi computer systems from the point of view of reliability. It describes in some detail techniques for achieving tolerance to both hardware and software faults. The paper concludes by outlining some of the major unsolved problems of reliable system design.

AD-A089 284/4 PC **A03**/MF **A01**
Naval Postgraduate School Monterey CA
Dynamic Linking in a Microcomputer Environment.
Technical rept.,
Gerald B. Blanton, and Roger R. Schell. May 80, 32p Rept no. NPS52-80-008

The design of a dynamic linker for use with modern microcomputers is introduced. The basic concepts for resolving symbolic interprocedure references at execution time are reviewed, and the means to support shared data and (pure) procedures are explained. The mechanism (modules and data bases) suitable for microcomputers without the hardware features previously considered necessary for dynamic linking are described. The major implications for the associated operating system and language translators are identified. (Author)

AD-A089 322/2 PC **A02**/MF **A01**
Wharton School Philadelphia PA Dept of Decision Sciences
Window Management System User's Manual.
Technical rept.,
David Oppenheim, Arnold Greenfield, and E. Gerald Hurst, Jr. Aug 80, 25p Rept no. 80-08-06
Contract N00014-75-C-0440

The Window Management System (WINDOWS) is designed to overcome certain limitations on computer decision aids which stem from the fact that the user of such aids is typically restricted to interacting with one computer program at a time. The decision maker has access to a variety of different sources of information, such as books, graphs, maps, and notes. WINDOWS makes it possible to divide a single computer terminal into multiple 'sub-terminals,' thus enabling decision makers to interact with more than one computer process at a time from a single terminal. In addition, WINDOWS allows the decision maker to control all of the computer processes from a single keyboard. (Author)

AD-A089 329/7 PC **A04**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
Software Control During Development and Acquisition.
Master's thesis,
Robert J. Lamkey, and Curtis T. Pavy. Jun 80, 73p Rept no. AFIT-LSSR-62-80

The Air Force has experienced some difficulty in obtaining quality software under specified cost, schedule, performance criteria. This thesis was undertaken to explore the underlying problem and to research methods for improving Air Force software acquisitions. The literature highlighted a number of problem areas evident in Air Force and DOD in general. The major problem areas were: (1) lack of measurable milestones, (2) lack of consideration for the integration of hardware and software, and (3) lack of software visibility during development, and (4) lack of user involvement. The researchers used those problem areas as a basis for conducting interviews at a major non-DOD software user/producer. The effort identified aspects of a software control process with potential applications for Air Force use. The researchers discovered that an effective software control process is feasible, but it rests upon a realization of the unique nature of software. Also, the impact of quality assurance, user involvement, and development planning upon the final software product are discussed. (Author)

AD-A089 332/1 PC **A03**/MF **A01**
RAND Corp Santa Monica CA
A U.S. Air Force Cost Analysis Cost Estimating Model Program for Use with the 'TI Programmable 59' Handheld Calculator,
Joe M. Balding. May 78, 31p Rept no. RAND/P-6130

This paper documents a Texas Instruments 'TI Programmable 59' calculator program that uses the U.S. Air Force Cost Analysis Cost Estimating (CACE) model described in Air Force Regulation 173-10, Volume I, USAF Cost and Planning Factors, dated 6 February 1975. The CACE model was designed with a 'building block' approach to estimate annual operating costs of aircraft weapon systems. The model is useful to Air Force organizations, other Government agencies, and government contractors for cost analysis, life cycle cost exercises, or studies concerned with cost effectiveness comparisons between weapon systems. The program described in this paper provides the user with a means of using the CACE model with a hand-held programmable calculator, eliminating lengthy manual computation or the necessity of using a computer. With its calculator connected to the Texas Instruments 'PC-100A Print Cradle,' the program allows the user to select among several cost factor input methods, estimate output formats, and summarization options.

AD-A089 413/9 PC **A04**/MF **A01**
Maryland Univ College Park Computer Vision Lab
On the Correlation Structure of Nearest Neighbor Random Filled Models of Images.
Interim rept.,
R. Chellappa. Jul 80, 57p TR-912, AFOSR-TR-80-0945
Grant AFOSR-77-3271

This paper discusses the correlation structure of some two-dimensional nearest neighbor random field models of images. The correlation structure of two nonequivalent random field models, the so-called simultaneous model and the conditional Markov model, are analyzed in continuous as well as discrete space. Analyses of two-dimensional moving average models and autoregressive and moving average models are also included. Based on the structure of the correlation function at lower lags an empirical test is suggested for the inference of image models. Examples from real textures are given. (Author)

AD-A089 424/6 MF **A01**
George Washington Univ Washington DC School of Engineering and Applied Science
Performance Optimization of the PASCAL to DEC VAX 11/780 Microcode Compiler.
Final rept. 16 Nov 79-16 Aug 80,
R. E. Merwin. 18 Aug 80, 95p
Contract DASG60-80-C-0006
Availability: Microfiche copies only.

Previous research activity at The George Washington University has demonstrated the feasibility of designing a compiler which accepts a high level (programming) language (HLL) and produces microcode for a computer with a horizontal control word format. On going research activity described herein is demonstrating the feasibility of designing a compiler with PASCAL as an input HLL that can generate microcode for the DEC VAX 11/780 computer which is installed in the BMDATC Distributed Data Processing (DDP) Test Bed. The effort described has as its goal the installation of this compiler at the Test Bed and to interface with the 'User Microprogramming' support software provided by DEC. Additional tasks include optimizing the performance of the compiler and conducting a study of the interface between compiler generated microcode and CPU architectures. (Author)

AD-A089 433/7 PC **A05**/MF **A01**
Electronic Systems Div Hanscom AFB MA
Preliminary Notes on the Design of Secure Military Computer Systems.
Technical rept. Aug-Nov 72,
Roger R. Schell, Peter J. Downey, and Gerald J. Popek. Jan 73, 80p Rept no. ESD-TR-80-127
See also Rept. nos. MTR-2547-VOL-1, AD-770 768 and ESD-TR-73-51-VOL-2, AD-772 806.

This document is a collection of working papers produced by the members of the Computer Security Branch, Directorate of Information Systems Technology, Deputy for Command and Management Systems. These papers identify the direction of ongoing computer security efforts. (Author)

AD-A089 461/8 PC **A05**/MF **A01**
Virginia Polytechnic Inst and State Univ Blacksburg Human Factors Lab
Generic Data Transaction System. Version 2. System Design.
Technical rept. 15 Jul 78-15 Jul 79,
John E. Evans, III , L. Hardy Mason, and Robert C. Williges. Mar 79, 84p Rept no. VPI-HFL-79-2/NPRDC-79-1
Contracts N00123-78-C-1401, N00123-77-C-1081
Supersedes Rept. no. VPI-HFL-78-2/NPRDC-78-2. See also Rept. no. VPI-HFL-79-3/NPRDC-79-2.

This report and its companion (HFL-79-3/NPRDC-79-2) supersede HFL-79-2/NPRDC-78-2, documenting an enhanced version of the same system. The program described is a machine dependent, table driven, general software system written for the advanced programmer to communicate the internal operations of the software. Included are a description of data structures, program logic, and user interfaces. The Fortran IV software processes randomly accessed data which are tree structured by file, record, page, and field, and includes a functionally complete primitive command language, a display format processor, and provision for user supplied software appendages. (Author)

AD-A089 484/0 PC **A03**/MF **A01**
Southeastern Massachusetts Univ North Dartmouth Dept of Electrical Engineering
Two Experiments on Statistical Image Segmentation.
Technical rept.,
C. H. Chen, and Chihsung Yen. 15 Sep 80, 28p Rept no. SMU-EE-TR-80-9

Contract N00014-79-C-0494

Recently there has been a considerable research interest in applying statistical pattern recognition theory to image segmentation. As the image is rich in statistical information, effective segmentation of images into meaningful parts can be performed by using statistical techniques. In this report, we present segmentation results on infrared and reconnaissance images using two different statistical pattern recognition methods. The first experiment is on the Alabama data base infrared images using the Fisher's linear discriminant analysis (1). To preserve the inter-pixel dependence as much as possible, measurements are taken in the form of a 3 x 3 matrix. That is we are dealing with matrix measurements instead of vector measurements as typically considered in statistical pattern recognition. (Author)

AD-A089 511/0 PC **A03**/MF **A01**
Maryland Univ College Park Dept of Computer Science
On Cellular Straight Line Segments.
Technical rept. series,
Chul E. Kim. Jul 80, 32p TR-918, AFOSR-TR-80-0864
Grant AFOSR-77-3271

We discuss a scheme for digitizing curves that is consistent with a scheme for digitizing regions. It is shown that the cellular image of a region is determined by the cellular image of its boundary by the scheme. It is proved that the chord property is a necessary and sufficient condition for a cellular arc to be a cellular straight line segment. By showing that the chord property and the cellular convexity condition are equivalent, we prove that a cellular arc is a cellular straight line segment if and only if it is cellularly convex. This leads to an algorithm to determine whether or not a cellular complex is a cellular straight line segment in time linear in the number of rows of cells. Finally it is proven that a cellular complex is cellularly convex if and only if any pair of its cells is connected by a cellular straight line segment in the cellular complex. (Author)

AD-A089 549/0 PC **A02**/MF **A01**
Maryland Univ College Park Dept of Computer Science
Evaluating Automatable Measures of Software Development,
Victor R. Basili, and Robert W. Reiter, Jr. 1979, 12p AFOSR-TR-80-0775
Grant AFOSR-77-3181
Pub. in Workshop on Quantitative Software Models, p107-116 Oct 79.

No abstract available.

AD-A089 561/5 PC **A02**/MF **A01**
Rensselaer Polytechnic Inst Troy NY Dept of Electrical and Systems Engineering
Implementation of Two Hidden-Line Algorithms,
M. Potmesil, and H. Freeman. 25 May 79, 12p AFOSR-TR-80-0829
Grant AFOSR-76-2937
Pub. in Computer and Graphics, v5 p31-40 1980.

No abstract available.

AD-A089 609/2 PC **A04**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Arachne User Guide. Version 1.2.
Technical summary rept.,
Raphael Finkel, Marvin Solomon, and Ron Tischler. Apr 80, 59p Rept no. MRC-TSR-2066
Contracts DAAG29-75-C-0024, DAAG29-80-C-0041

Arachne is a multi-computer operating system running on a network of LSI-11 computers at the University of Wisconsin. This document describes Arachne from the viewpoint of a user or a writer of user-level programs. All system service calls and library routines are described in detail. In addition, the command-line interpreter and terminal input conventions are discussed. Companion reports describe the purpose and concepts underlying the Arachne project and give detailed accounts of the Arachne utility kernel and utility processes. (Author)

AD-A089 616/7 PC **A04**/MF **A01**
University of Southern California Marina Del Rey Information Sciences Inst
Graphics Language (Version 2.1).
Technical manual,
Richard Bisbey, II , Dennis Hollingworth, and Benjamin Britt. Jul 80, 70p Rept no. ISI/TM-80-18-REV-2.1
Contract DAHC15-72-C-0308, ARPA Order-2223

This document defines the language interface to Version 2.1 of a device-independent graphics system intended to facilitate the use of graphics in the command and control environment. The system homogeneously supports graphics terminals of widely varying capability, configured with one or more different program running on separate computers connected via a C2 communications network. These include both calligraphic and bit-map displays as well as plotters. The set of graphics primitives defined here provides a core upon which device-independent application- tailored graphics packages can be built. Advanced graphics features such as color, shading, and input from multiple devices are supported in a manner that permits use of the same application program with devices not supporting those features. The graphics system performs the appropriate feature mapping to support the connected display device. For example, an application program may specify the color of a line segment. The system maps the specified color into some suitable color supported by the device or--in the case of a monochromatic display--into the single color of that device. An enquiry capability is also provided, permitting the application program to determine the characteristics of the connected display device and fully exploit all of its capabilities. (Author)

AD-A089 671/2 PC **A02**/MF **A01**
Maryland Univ College Park Dept of Computer Science
The Direct LISP Approach to Function Environment Manipulation.
Technical rept.,
Richard J. Wood. Jun 80, 17p Rept no. TR-907
Contract N00014-76-C-0477

This paper reviews some of the control structures that have become popular in new extensions to LISP-based programming languages. A method for constructing these complex control structures that employs LISP features without the cost of double evaluation is developed. This technique, called the direct LISP approach, uses the LISP functions FUNCTION and EVAL to maintain and manipulate function access environments. Control environment manipulation is accomplished using continuation pointers and lambda expressions. This approach factors function execution into two distinct steps. First the function is associated with an environment and then it is invoked. The normal LISP evaluation routines retrieve the associated environments and apply the function. This method allows the programmer flexibility to design complex control structures without expensive overhead costs. Several examples that employ the direct LISP approach are presented and discussed. (Author)

AD-A089 673/8 PC **A03**/MF **A01**
Naval Research Lab Washington DC
A Scaling and Plotting Routine for Two Dimensional Data.
Memorandum rept.,
Terry R. O'Neal. 30 Sep 80, 34p Rept no. NRL-MR-4351

This report provides a general plotting routine to express x, y type tabular data in a 2 dimensional graphical form. The program contains a scaling routine to maximize plot coverage and calculate axis length and tick marks. The routines are written in Fortran IV computer language and designed to run on a Hewlett-Packard HP 1000 computer system with Graphics 1000 plotting software and a graphics terminal or plotter. (Author)

AD-A089 678/7 PC **A05**/MF **A01**
IIT Research Inst Rome NY
Data and Analysis Center for Software.
Interim rept. Aug 78-Feb 80,
Lorraine M. Duvall, Shirley A. Gloss-Soler, and Jon Martens. Jun 80, 94p RADC-TR-80-204
Contract F30602-78-C-0255

The Data and Analysis Center for Software (DACS) is being established to serve as a central source for information and data on software technology. This interim report presents the status of the DACS after the initial 18 months of development. Descriptions of the software engineering computer database and the technology information base are provided. This report also contains information on the types of products developed during this reporting period and the technical inquiries received relating to software technology. (Author)

N80-31856/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
A Description of a System of Programs for Mathematically Processing on Unified Series (YeS) Computers Photographic Images of the Earth Taken from Spacecraft.
V. G. Zolotukhin, B. I. Kolosov, D. A. Usikov, V. I. Borisenko, and S. T. Mosin. Jun 80, 29p NASA-TM-76208, PR-336
Contract NASW-3198
Transl. Into English of "Opisaniye Systemy Programm Mathematicheskoy Obrabutki NA Evm Yedinoy Serii (Es) Fotograficheskikh Apparatov (Kompleks Sofi)", Rept. Pr-336 Acad. Of Sci. USSR, Inst. Of Space Research, Moscow, 1977 p 1-30. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By Academy of Sciences (Ussr), Moscow.

A description of a batch of programs for the YeS-1040 computer combined into an automated system for processing photo (and video) images of the Earth's surface, taken from spacecraft, is presented. Individual programs with the detailed discussion of the algorithmic and programmatic facilities needed by the user are presented. The basic principles for assembling the system, and the control programs are included. The exchange format within whose framework the cataloging of any programs recommended for the system of processing will be activated in the future is displayed.

N80-31858/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
State Estimation and Absolute Image Registration for Geosynchronous Satellites.
R. S. Nankervis, D. W. Koch, and H. M. Sielski. May 80, 16p NASA-TM-80712
Contract NAS5-24350
Presented at the Conf. Of the AM. Congr. On Surv. And Mapping and AM. Soc. Of Phot., St. Louis, 9-14 Mar. 1980.

Spacecraft state estimation and the absolute registration of Earth images acquired by cameras onboard geosynchronous satellites are described. The basic data type of the procedure consists of line and element numbers of image points called landmarks whose geodetic coordinates, relative to United States Geodetic Survey topographic maps, are known. A conventional least squares process is used to estimate navigational parameters and camera pointing biases from observed minus computed landmark line and element numbers. These estimated parameters along with orbit and attitude dynamic models are used to register images, using an automated grey level correlation technique, inside the span represented by the landmark data. In addition, the dynamic models can be employed to register images outside of the data span in a near real time mode. An important application of this mode is in support of meteorological studies where rapid data reduction is required for the rapid tracking and predicting of dynamic phenomena.

N80-31864/5 PC **A03**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
A Study of LANDSAT Multispectral Scanner Data Tapes.
A. H. Benny. Feb 80, 37p RAE-TR-80018, RAE-SPACE-574

A detailed study is described of a number of computer compatible magnetic tapes containing LANDSAT multi-spectral scanner (MSS) data. The differences between raw and corrected data tapes are shown along with the conversion process. It also shows the differences between the existing and a new form of corrected data tape. A computer

program was written to enable raw data desirable for certain computer analyses to be obtained from the existing stocks of corrected data tapes.

N80-31865/2 PC **A05**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (Germany, F.R.). Abteilung Digitale Bildverarbeitung.
Comparative Experimental Study on the Use of Original and Compressed Multispectral LANDSAT Data for Applied Research.
K. A. Ulbricht. Feb 80, 81p DFVLR-FB-80-03, ESA-CR(P)-1343
Contract ESTEC-3569/78-NL-HP(SC)
Original Contains Color Illustrations.

Parts of two multispectral LANDSAT scenes, compressed by ratio 6.4 to 1, were investigated to determine the effect of the compression on the image contents. The LANDSAT image of the Bayuda desert in Sudan was submitted to supervised maximum likelihood classification before and after compression of data as a function of the rejection class parameter sigma. Different approaches as to the use of circular or rectangular training areas for classification on original and compressed scene served to investigate the influence of compression on image contents. Partitioning of classified image is given on a percentage basis as a function of sigma. Three dimensional clusters of spectral channels and histograms show the influence of compression. The heavy populaiton of blue green algae on LANDSAT scene of the baltic of August 7, 1975, was another example used to test the influence of data compression. Three dimensional clusters of grey values of spectral channels of the investigated area and histograms show influence of compression. The effects of compression on partitioning of classified scences, are displayed in several tables and figures.

N80-31879/3 PC **A05**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Three Computer Codes to Read, Plot and Tabulate Operational Test-Site Recorded Solar Data.
S. D. Stewart, R. S. Sampson, Jr., R. E. Stonemetz, and S. L. Rouse. Jul 80, 89p NASA-TM-78293
Sponsored in Part by DOE.

Computer programs used to process data that will be used in the evaluation of collector efficiency and solar system performance are described. The program, TAPFIL, reads data from an IBM 360 tape containing information (insolation, flowrates, temperatures, etc.) from 48 operational solar heating and cooling test sites. Two other programs, CHPLOT and WRTCNL, plot and tabulate the data from the direct access, unformatted TAPFIL file. The methodology of the programs, their inputs, and their outputs are described.

N80-32175/5 PC **A03**/MF **A01**
Centre National d'Etudes Spatiales, Toulouse (France).
Analysis of Principle Components in the Sebestyen Discrimination Method Role d'Analyse en Composantes Principales dans la Methode de Discrimination de Sebestyen.
J. P. Thouvenin. Jan 80, 41p CNES-NT-92
Text in French; English Summary.

Sebestyen's decision - discrimination method based on principal component analysis is explained. This method is the basis of the data discrimination system for the resonance measurement experiment flown on board the ISEE 1 satellite launched by NASA in October 1977. This pattern recognition problem is fully developed. The optimal number of characteristics needed to describe a data point is determined. The point is represented in N-dimensional space where the different axes correspond to the desired characteristics. The unity of the distance between each point along each axis is then analyzed to determine if it is equal or not to the variance of the characteristic corresponding to that axis. A minimum variance defines the discrimination.

PB81-103996 PC **A08**/MF **A01**
Electronics Research Lab., Adelaide (Australia).
The Adaptation and Installation of the Resource Access Control Facility (RACF).
Technical rept.,
J. L. Roughan, and J. C. Gwatking. Apr 80, 160p ERL-0136-TR, AR-001-985

The Resource Access Control Facility (RACF) is a software package designed to control access by users to a computer system and to data stored on the system. This report describes the modifications and additions to the functions of RACF which were made during its installation in the computing center at the Defense Research Center. RACF is described in sufficient detail to allow the operation of the modifications to be clearly explained. The report also summarizes the functions and standards of the computing center and lists the actions taken to accommodate users with non-standard requirements.

PB81-104168 CP **T05**
Municipal Environmental Research Lab., Cincinnati, OH. Wastewater Research Div.
EXEC/OP FORTRAN Source Code.
Software,
Lewis A. Rossman. Jun 80, mag tape EPA/DF-80-009
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB80-174220, and PB81-104176.

EXEC/OP is a Fortran computer program that performs preliminary design synthesis of municipal wastewater treatment and sludge disposal systems. It selects the components in the wastewater treatment and sludge disposal trains from a list of candidate process units with fixed design characteristics so that criteria on effluent quality, cost, energy, land utilization, and subjective undesirability are best satisfied. The computational procedure uses implicit enumeration coupled with a heuristic penalty method that accounts for the impact of return sidestream from sludge processing. The program can consider eight different types of wastewater treatment processes and thirteen different types of sludge treatment processes. This computer magnetic tape file contains the Fortran source code for Version 1.2 of the EXEC/OP program.

PB81-105322 PC **A13**/MF **A01**
Bolt Beranek and Newman, Inc., Cambridge, MA.
Formal Specification of the Transport and Session Protocols.
Draft rept.,
Richard Tenney, John Burruss, and Gregory Pearson. Jun 80, 281p BBN-4445, NBS-GCR-80-289, ICST/HLNP-80-5
Contract NB79-SBCA-0092

This report is the third report on the development of transport and session control protocols under the Federal Computer Network Protocol Standards Program (NBS80). This report will specify the actual operation of the transport and session control protocols.

PB81-106486 PC **A14**/MF **A01**
National Bureau of Standards, Washington, DC. Inst. for Computer Sciences and Technology.
Computer Science and Technology: Computer Performance Evaluation Users Group (CPEUG); Proceedings of the Meeting (16th) Held at Orlando, Florida on October 20-23, 1980.
Final rept.,
Harold Joseph Highland. Oct 80, 322p NBS-SP-500-65
Library of Congress catalog card no. 80-600155.
See also report dated Nov 76, PB-290 701.

The Proceedings record the papers that were presented at the Sixteenth Meeting of the Computer Performance Evaluation Users Group (CPEUG 80) held October 20-23, 1980, in Orlando, Florida. CPEUG 80 focused on new applications that are expected to grow in the 80's and changes that may occur in traditional areas during the 80's. The program was divided into two parallel sessions and included technical papers on previously unpublished work, case studies, tutorials, and panels. Technical papers are presented in the Proceedings in their entirety.

PB81-108342 PC **A02**/MF **A01**
National Weather Service, Salt Lake City, UT. Western Region.
AFOS System Local Database Save and Rebuild Procedures or a Master Doomsday Program,
Brian W. Finke. Jul 80, 17p NOAA-NWS-WRCP-16, NOAA-80082104

No larger disaster can befall any AfOS site than the loss of the system disks (DPO and/or DPOF). This may come about either through hardware or software malfunctions. Over the period of the last year the disks in use at WSFO Los Angeles have been changed on numerous occassions due to additional background software an I/O channel modifications. It is difficult to find time to take the entire system down to periodically up-date the Running Master Disks especially at a WSFO where four disks must be duplicated. Therefore a few procedures were developed to save, rebuild and/or update a site's local procedures, messsage composition pre-formats, wish list, and restoration of background applications programs.

PB81-108623 CP **T02**
National Bureau of Standards, Washington, DC. Inst. for Computer Sciences and Technology.
Counties and County Equivalents of the States of the United States.
Data file,
Alan Wenberg. 15 Dec 79, mag tape NBS/DF-81/001
Supersedes Rept. no. NBS/DF-73-005, COM-74-11289.
Source tape is in ASCII or EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, FIPS PUB-6-3.

The data file provides names and codes for representing the Counties of the 50 states or county equivalents thereof for use in the interchange of formatted machine sensible data. Also included in the set of codes are the independent cities of Maryland, Missouri, Nevada, and Virginia and the Census Divisions and boroughs of Alaska. The following data elements are provided: State abbreviation, State code, county name, and county code. File use and descriptions are found in FIPS PUB 6.3.

PB81-113524 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. Inst. for Computer Sciences and Technology.
Computer Science and Technology: Validating the Correctness of Hardware Implementations of the NBS Data Encryption Standard.
Final rept.,
Jason Gait. Sep 80, 50p NBS-SP-500-20
See also report dated Nov 77, PB-273 648. Library of Congress catalog card no. 77-16067.

The publication describes the design and operation of the NBS testbed that is used for the validation of hardware implementations of the Federal Information Processing Data Encryption Standard (DES). A particular implementation is verified if it correctly performs a set of 291 test cases that have been defined to exercise every basic element of the algorithm. As a further check on the correctness of the implementation an extensive Monte-Carlo test is performed. This publication includes the full specification of the DES algorithm, a complete listing of the DES test set and a detailed description of the interface to the testbed.

9C. Electrical and Electronic Engineering

AD-A089 165/5 PC **A08**/MF **A01**
California Univ Livermore Lawrence Livermore Lab
EMP Coupling to Ships,
F. J. Deadrick, H. S. Cabayan, Karl F. Kunz, R. M. Bevensee, and L. C. Martin. Jan 80, 165p
Rept no. UCRL-52803
Contract W-7405-ENG-48

Prepared in cooperation with Lu Tech, Inc.

Scale-model tests were conducted to establish the adequacy and limitations of model measurements as tools for predicting electromagnetic pulse (EMP) coupling voltages and currents to the critical antennas, cables, and metallic structures on ships. The scale-model predictions are compared with the results of the full-scale EMP simulation test of the Canadian ASW ship, HMCS Huron. (The EMP coupling predictions in this report were made without prior knowledge of the results of the data from the HMCS Huron tests.) This report establishes that the scale-model tests in conjunction with the data base from our EMP coupling modules provides the necessary information for source model development and permits effective, low cost study of particular system configurations. (Author)

AD-A089 343/8 PC **A06**/MF **A01**
Texas Univ At Austin Electronics Research Center
Annual Report on Electronics Research at The University of Texas at Austin.
Rept. no. 27, 1 Apr 79-31 Mar 80,
Edward J. Powers, and Steven I. Marcus. 15 May 80, 112p
Contract F49620-77-C-0101

This report summarizes progress on projects carried out at the Electronics Research Center at The University of Texas at Austin and which were supported by the Joint Services Electronics Program. In the area of Information Electronics progress is reported for projects involving (1) nonlinear filtering and estimation, (2) electronic multi-dimensional signal processing, (3) electronic computer system design and analysis and (4) electronic computer software systems. In the Solid State Electronics area recent findings in (1) basic solid state materials research and (2) research on instabilities and transport near surfaces and interfaces of solids are described. In the area of Quantum Electronics progress is presented for the following projects: (1) nonlinear wave phenomena, (2) atomic and molecular electronic processes and (3) high power laser systems. In the Electromagnetics area progress in (1) electromagnetic signal analysis and identification, and (2) Guided-Wave Devices for the far infrared-mm wave spectrum is summarized. (Author)

AD-A089 563/1 PC **A02**/MF **A01**
MARK Resources Inc Marina Del Rey CA
A Compensation Method for Quadrature Modulation.
Technical note,
I. P. Bottlik. 30 Nov 77, 15p Rept nos. MRI-149-1, MRI-TN-105-029
Contract DAAK40-78-C-0031

Two methods of modulation, quadrature and amplitude-phase, are being considered for the near-term implementation of clutter or extended targets. A test of quadrature modulation has been made with fairly good results (44 dB suppression for single-sided Gaussian spectrum), but manual adjustments were required which are operationally impractical for the 32 modulators of the system. Amplitude-phase modulation has not yet been tested; however, some form of compensation will be required, and it is likely to be complicated, based on the experience with the array pointing attenuators and phase shifters. Tests of amplitude-phase modulation are required to determine the complexity of the compensation. Because of the encouraging results with quadrature modulation, it would be desirable to pursue the investigation further with this modulation scheme. Towards this end we present a relatively simple compensation method for quadrature modulation which, based on a postulated error model, improves the sidelobe suppression, removes the necessity of frequent manual adjustments, and is amendable to non-real time automatic calibration. A test of the compensation method is required to determine the actual degree of improvement and the complexity of the compensation. We show that such a test can be carried out using presently available hardware. It is recommended that such a test be conducted. (Author)

AD-A089 570/6 PC **A08**/MF **A01**
Illinois Univ At Urbana-Champaign Coordinated Science Lab
Optimized Computer Systems for Avionics Applications.
Final technical rept. 1 Feb-30 Sep 79,
R. T. Chien, and L. J. Peterson. Feb 80, 175p
AFAL-TR-79-1235
Contract F33615-78-C-1559

The main purpose of this project is to investigate the commonalities among the four subareas of signal processing, namely, radar, communications, image processing and electronic warfare; and to establish possible common functional descriptions as the basis for a common architecture. An extensive search was made to list all important kernels and algorithms in radar, communications and image processing. These kernels and algorithms were carefully analyzed with respect to their computational complexity and identification of commonality for architectural purposes. It was discovered that significant commonalities do exist in many areas. These common areas represent significant overlap and commonality which can be utilized in a common architecture. (Author)

N80-31481/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
The Vulnerability of Electric Equipment to Carbon Fibers of Mixed Lengths: An Analysis.
W. Elber. Aug 80, 23p NASA-TM-80215

The susceptibility of a stereo amplifier to damage from a spectrum of lengths of graphite fibers was calculated. A simple analysis was developed by which such calculations can be based on test results with fibers of uniform lengths. A statistical analysis was applied for the conversation of data for various logical failure criteria.

N80-31482/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
A Carbon Fiber Exposure Test Facility and Instrumentation.
A. L. Newcomb, Jr. Aug 80, 47p NASA-TM-80220

A facility to evaluate the risk associated with the exposure of electrical and electronic equipment to airborne carbon/graphite fibers was constructed. A wide variety of instrumentation is described and illustrated.

PB81-104473 Not available NTIS
National Bureau of Standards, Washington, DC.
Laser to Microwave Frequency Division Using Synchrotron Radiation II.
Final rept.,
J. C. Bergquist, and D. J. Wineland. 1979, 4p
Pub. in Proc. Annual Frequency Control Symposium (32nd), Atlantic City, NJ., May 3-June 1, 1979, p494-497 1979.

The authors present a review of theoretical calculations which demonstrate the feasibility of obtaining one step frequency division from optical or infra-red laser frequencies to a subharmonic in the microwave spectral region, and include current experimental designs toward a practical realization of this goal.

9D. Information Theory

AD-A089 432/9 PC **A02**/MF **A01**
Rhode Island Univ Kingston Dept of Electrical Engineering
Improved Spectral Resolution II.
Final rept. 1 Jun 77-30 Jun 80,
Donald W. Tufts, and Ramdas Kumaresan. 1 Sep 80, 13p Rept no. URI-ELE/80/3
Contract N00014-77-C-0534
Pub. in IEEE International Conference on Acoustics, Speech and Signal Processing, p592-597 Apr 80.

No abstract available.

AD-A089 578/9 PC **A02**/MF **A01**
MARK Resources Inc Marina Del Rey CA
Generating Real-Time Clutter Sequences - Preliminary Fortran Version.
Technical note,
R. L. Mitchell. 13 Jun 78, 4p Rept nos. MRI-149-23, MRI-TN-105-045
Contract DAAK40-78-C-0031

Attached is a Fortran subroutine (TIMESQ) and a companion subroutine (GAUSSPN) to generate essentially a continuous clutter signal sequence where the parameters are set in real-time. For this preliminary version, three arrays, specifying the amplitude spectral functions on the sigma delta A, and delta E channels are the inputs to TIMESQ. The subroutine to generate the amplitude spectral functions from the engagement geometry is under development. Basically a table of parameter values will be stored; then given the engagement geometry the desired values will be retrieved from the table, possibly with interpolation; finally, the amplitude spectral functions will be generated from the parameters. Current design is based on 14 parameters for the three channels. The most time consuming computation predicted is an exponential (4 microsec on the AP120B) for each spectral sample. The portion of the FFT computation for each sample is 6.3 microsec, and the total time allowed for all operations is 27 microsec per sample. Therefore, there appears to be sufficient time available to implement this approach on the AP120B.

N80-31714/2 PC **A02**/MF**A01**E
Fondazione Ugo Bordoni, Rome (Italy).
Quantization Noise Spectra Calculation Calcolo Dello Spettro Del Rumore di Quantizzazione.
A. Fiocco, L. Giacomelli, R. Lucarelli, and A. Roveri. Jun 79, 20p FUB-5-1979
Text in Italian.

The quantization noise power density spectrum calculation is studied and a discussion of the quantization noise definition presented. The application of the developed formulas allows the computation of the bilateral noise spectra as a function of the normalized frequency both for uniform and non-uniform quantization. Numerical examples are given in chart form.

N80-31717/5 PC **A03**/MF**A01**E
Fondazione Ugo Bordoni, Rome (Italy).
Some Properties of the Partial Response Codes of an Order Greater Than Two Su Alcune Proprieta' Dei Codici Partial Response di Ordine Superiore al Binario.
G. M. Poscetti. Jun 79, 36p FUB-9-1979
Text in Italian.

An analysis of the cases for which precoding of a generalized order is possible is presented, and the properties of the digital sum, used in limited digital sum codes, are studied for orders greater than two. It is concluded that a high number of levels in the codified message are usually found when using codes of a higher order, for which the studied cases are not expected to have immediate application.

N80-32176/3 PC **A03**/MF **A01**
Fondazione Ugo Bordoni, Rome (Italy).
Statistical Properties of the Digital Sum in Partial Response Codes Proprieta' Statische Della Somma Digitale Nei Codici Partial-Response.
G. M. Poscetti. Mar 79, 36p FUB-21-1979
Text in Italian.

A study of the statistical properties of the digital sum in partial response codes is presented with particular reference to the estimation of the variance as a significant parameter for the evaluation of the effect of distortion at low channel frequencies. The problems examined are the computation of the probability distribution and the autocorrelation of the message as a function of the incoming message statistical properties, and the analysis of the transit of a discrete time random process of known statistical characteristics through a linear system with known transfer functions.

9E. Subsystems

AD-A089 199/4 PC **A04**/MF **A01**
Motorola Inc Scottsdale AZ Government Electronics Div

SAW Programmable Matched Filter Signal Processor.
Final technical rept. 22 Sep 78-22 Jan 80,
Fred Hickernell. Jun 80, 65p RADC-TR-80-199
Contract F30602-78-C-0209

A monolithic surface wave programmable matched filter signal processor operating at 100 MHz was designed, fabricated and evaluated. The semiconductor and acoustic elements were developed on (001) n-type silicon oriented for acoustic transmission along the (100) direction. Surface acoustic waves at 100 MHz were generated by a zinc oxide film layer transducer into an array of 31 silicon-gate NMOS piezoresistive FET taps spaced at 10 ns intervals. The drain lines of all taps were connected to serve as the rf output. The phase and amplitude of each tap was controlled by a digital shift register and analog voltage to the tap gates. The die size for a single 31-bit filter was 0.980 inch by 0.120 inch. This development represented a significant step toward the realization of a compact, low cost highly versatile matched filter device for signal processing applications in communications equipment. Specific problem areas were solved. A quantitative assessment of various aspects of ZnO/Si-MOSFET technology was made and the viability of the monolithic integration of SAW and semiconductor circuitry on silicon was demonstrated.

AD-A089 241/4 MF **A01**
Stanford Univ CA
Computer Modeling of the Complete IC Fabrication Process.
Final rept. 17 Jan 77-15 Jun 80,
Robert W. Dutton. Sep 80, 50p ARO-14589.21-EL
Contract DAAG29-77-C-0006
Availability: Microfiche copies only.

This research effort has resulted in the development and distribution of the SUPREM program. The overall features of SUPREM allow for process design, fundamental kinetic studies and process control applications. Understanding and quantitative modeling of moving boundary oxidation and epitaxial growth conditions has been achieved. The models for diffusion and epitaxial growth involve multiple species and time dependent kinetic effects. An extensive set of experiments involving oxidation enhanced diffusion has resulted in a new quantitative model including the effects involving growth and retrogrowth of stacking faults. Moreover, the lateral dependence of oxidation enhanced diffusion was demonstrated for the first time and an estimate of a 2 micrometers lateral diffusion length was determined. A new transient epitaxial growth model was incorporated into SUPREM and experimental results for changes over more than two orders of magnitude in dopant concentration have been simulated. It has been demonstrated for the first time that silicon growth transients occur due to surface kinetic effects with a time constant of the same order of magnitude as for the dopant itself. (Author)

AD-A089 316/4 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Results of an Experimental Study of a Twin-Reflector Antenna with a Modified Counterreflector,
D. A. Dmitrenko, L. N. Zakhar'yev, A. A. Lemanskiy, and A. Ye. Tumanskaya. 30 Jul 80, 7p Rept no. FTD-ID(RS)T-1188-80
Edited trans. of Antenny, (USSR) n14 p25-27 1972 by Carol S. Nack.

No abstract available.

AD-A089 353/7 PC **A07**/MF **A01**
National Bureau of Standards Boulder CO Electromagnetic Technology Div
Josephson A/D Converter Development.
Annual technical rept. 1 May 79-30 Apr 80,
C. A. Hamilton, R. E. Harris, R. L. Kautz, F. L. Lloyd, and R. L. Peterson. 1 Sep 80, 148p Rept no. NBSSR-724-21-80
Contract N00014-80-F-0017

This report describes the third year of an effort to demonstrate an ultra-high-speed analog-to-digital converter using superconducting electronics. A converter was fabricated and tested at a sample rate of 2 x 10 to the 9th power samples/second. (Author)

AD-A089 422/0 MF **A01**
General Electric Co Pittsfield MA Ordnance Systems
Electrical Characterization of Special Purpose Linear Microcircuits.
Interim rept. Sep 78-Sep 79,
John S. Kulpinski, Theodore Simonsen, Louis Carrozza, Robert Mossman, and John Dunn. May 80, 276p RADC-TR-80-49
Contract F30602-78-C-0195
Availability: Microfiche copies only.

This report covers the work performed by General Electric Ordnance Systems pertaining to the electrical characterization and specification of linear microcircuits. The period of report is August 1978 to December 1979. This technical report is divided into chapters covering specific device types with electrical characterization results. The following device types/families were characterized: Adjustable Positive Voltage Regulators, Adjustable Negative Voltage Regulators, Precision BiFet Op Amps, Multiple BiFet Op Amps, 12 Bit A/D Converters, 12 Bit D/A Converters, Precision Voltage References, and Precision Sample/Hold Amplifiers. Data obtained during device characterization is published in handbook form obtainable under separate cover from this document. Samples of data sheets, histograms, and plots, are included in this report, however. (Author)

AD-A089 436/0 PC **A11**/MF **A01**
Naval Ocean Systems Center San Diego CA
Advanced Mail Systems Scanner Technology, Executive Summary and Appendixes A-D.
Annual rept. no. 5, 10 Oct 78-9 Oct 79,
Frank C. Martin, Thomas R. Little, Lee A. Wise, and Robert W. Basinger. Oct 79, 237p Rept no. NOSC/TR-520
See also Rept. nos. NELC/TR-1965, AD-A020 175, NOSC/TR-358, AD-A070 546 and PRRL-77-CR-42, AD-A062 399. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The objective of the effort described herein is to provide technical consultation, equipment, and support services to the US Postal Service which will contribute to the development of the system definition of a new concept processing system, the Electronic Message Service (EMS). Included in the scope of effort are investigations of high-speed image scanning technology, image frame memory storage, image enhancement, and the fabrication of a scanner/frame-store memory test assembly. The fifth annual report briefly describes the individual efforts of the reporting period in an executive summary and provides in-depth data in four appendixes: Appendix A, Data Capture; Appendix B, Color Imaging; Appendix C, Data Display Systems Performance Analyses; and Appendix D, EDM Hardware Evaluation. (Author)

AD-A089 568/0 PC **A02**/MF **A01**
MARK Resources Inc Marina Del Rey CA
Digital Quadrature Modulation.
Technical note,
I. P. Bottlik. 5 Jan 78, 14p Rept nos. MRI-149-7, MRI-TN-105-034
Contract DAAK40-78-C-0031

Two methods of modulation, analog quadrature and amplitude-phase, are being considered for the near term implementation of clutter and extended targets. Due to the practical non-linearities and imbalances of the physical devices implementing these modulation methods a compensation method is required to achieve acceptable performance. Rather complicated compensation tables are required, a calibration procedure is required to determine the table values, and the stability of the compensation is in question due to its sensitivity on possible drifts of the physical device characteristics. The compensation must be performed in real time and requires a considerable amount of digital processing. This report considers an alternate method of digitally processing the modulation signals to obtain a real signal which is then mixed up to the desired frequency. This mixing is the only operation subject to practical non-linearities and drifts. Such a simple mixing does not have the extreme sensitivity to mixer imbalances exhibited by analog quadrature modulation. It is anticipated that this mixing will require no compensation; however, should compensation be required it would be simple since only one signal (no cross-coupling) need by compensated. (Author)

AD-A089 571/4 PC **A02**/MF **A01**
MARK Resources Inc Marina Del Rey CA
Implementation of Digital Quadrature Modulation.
Technical note,
I. P. Bottlik. 27 Jan 78, 5p Rept nos. MRI-149-11, MRI-TN-105-037
Contract DAAK40-78-C-0031

Two basic methods of implementing digital quadrature modulation have been proposed. Although the multiplying D/A implementation appears at first look to be simpler than the digital multiplier implementation, a more detailed analysis favors the digital multiplier implementation. The digital multiplier implementation is about $9,500 less expensive since the multiplier may be easily multiplexed over 8 range gates. It is impractical to multiplex the analog reference voltage in the multiplying D/A implementation, and the required 4-quadrant multiplying DAC's are more expensive than the simple DAC's required for the digital multiplier implementation. Furthermore, the digital multiplying implementation may not be able to meet the performance requirements due to the slower setting time of multiplying DAC's and the unknown capability of the multiplying DAC to follow the rapid changes of the reference voltage. It is thus recommended that the implementation of digital quadrature modulation be the digital multiplier method. Cost estimates for both methods of implementation are presented in Tables 1 and 2. The designs are for four channels of eight range gates each, including the interfacing to the array processor. The costs do not include conversion to 2's complement integers which might be accomplished in the array processor. Space requirement is 7 to 10 inches of 19 inch rack space for either implementation. (Author)

N80-31684/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
A Simple Stripline Design for Uneven Power Split.
M. C. Bailey. Aug 80, 10p NASA-TM-81870

A technique for the design of stripline or microstrip power dividers for unequal, but in-phase, power split is described. The output power ratio is determined by selecting the location of the input port in a manner analogous to the tap point for an electric power transformer. The technique yields a usable bandwidth of 7 to 8 percent and is attractive for tapered amplitude distribution networks for narrow band phased arrays.

N80-31727/4 PC **A04**/MF **A01**
Laboratorio di Ricerca e Technologia per lo Studio del Plasma nello Spazio, Frascati (Italy).
The Noise in Electric Networks II Rumore Nelle Reti Elecrtriche.
G. V. Pallottino. May 80, 52p LPS-80-10
Text in Italian.

Models representing noise in electrical networks with one or two ports are discussed. A general expression was derived for the noise factor and for noise temperature for the case of arbitrary correlation among equivalent noise generators. The problems related to networks implemented by several cascaded blocks are briefly discussed.

N80-31740/7 PC **A04**/MF **A01**
Centre de Recherches en Physique de l'Environnement, Issy-les-Moulineaux (France). Dept. ETE.
Voltage Converter (Dc/DC) Used on a Satellite. Applications to the Arcad 3 and Picpab Projects Convertisseur d'Alimentation DC/DC Embarque sur Satellite. Applications aux Projets Arcad 3 et Picpab.
M. Auger. 2 Nov 79, 54p CRPE-NT-77
Text in French.

The specifications of a converter of the type used for the ISOPROBE experiment are given. A model was built and tested, the ARCAD3. The circuit diagrams are presented and problems discussed in terms of off-the-shelf components presently available.

N80-31741/5 PC **A02**/MF **A01**
Royal Signals and Radar Establishment, Malvern (England).
Microwave Frequency Memory.
C. M. Boyne. Mar 80, 16p RSRE-MEMO-3257, BR74217

A circuit is described which is capable of remembering the frequency of a single pulse of RF in the band 9.2 - 9.8 GHz. The minimum pulse duration is 100 nsec and the set on accuracy is to within + or - 5 MHz. The memory is an oscillator which is set to one of a number of discrete frequencies by the injection of an RF pulse. It is shown that the oscillator can be switched to a new frequency at any time by injecting a new signal.

N80-31742/3 PC **A03**/MF **A01**
Defence Research Information Centre, Orpington (England).
Integration of Filters by Means of Linear MOS Circuits.
P. Christiansen, P. J. Gebhardt, and G. Kohlbacher. May 80, 37p DRIC-T-6106, BR74161
Transl. Into English from Wiss. Ber. Aeg-Telefunken, V. 52, No. 1/2, 1979 p 131-138. Sponsored by Bundesministerium fuer Forschung und Technologie.

The implementation and characteristics of charge coupled device filters and switched capacitor filters produced using linear MOS technology are described. The analysis includes a discussion of circuit sections such as input stages, differential current integrator, clock pulse generator, inverters, source followers, differential amplifiers, and operational amplifiers, all using linear MOS circuit techniques.

PAT-APPL-6-165 598 PC **A02**/MF **A01**
Department of the Navy Washington DC
Programmable Frequency Synthesizer (PFS).
Patent Application,
Joseph L. Mantione. Filed 3 Jul 80, 23p AD-D007 453/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A programmable frequency synthesizer (PFS) consists of three serially connected stages: an accumulator, a triangle converter, and a sine shaper. The accumulator is the frequency-generating stage of the synthesizer. Its square wave output is divided in frequency by the triangle converter, which produces a triangularly shaped staircase wave-form. The sine shaper stage employs diode limiters and filters to produce sinusoids from the triangular staircase. The basic accumulator consists of an input latch to store the binary programmed frequency, an adder, an output latch to store the output of the adder, and a clock oscillator. The output of the output latch is fed back to one input of the adder while the other input of the adder is connected to the input latch. Since this stage simply adds the value of the input latch to the previous value of the output latch, it is called an accumulator. Only the most significant bit (MSB) of the output latch is transmitted to the triangle converter stage, which follows it.

PAT-APPL-6-167 275 PC **A02**/MF **A01**
Department of the Navy Washington DC
A Sawtooth Waveform Generating Circuit for Utilization in a Helmet Mounted Display.
Patent Application,
Herbert Berke, John H. Allen, and Joseph R. Owen. Filed 19 Jul 80, 13p AD-D007 451/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A sawtooth waveform circuit for a cathode ray tube display apparatus or the like is disclosed for providing a sawtooth waveform signal in synchronization with the uniformly spaced pulses of a sync signal. A direct current voltage is supplied to an integrator which produces a ramp voltage. Switching means responsive to each pulse of the sync signal shorts the integrator so as to cause the ramp voltage to appear at the output of the integrator as a sawtooth waveform signal. A summing amplifier amplifies the sawtooth waveform signal, and then combines the amplifier sawtooth waveform signal with a variable direct current voltage generated by a head tracker so as to provide at the output of the summing amplifier a raster drive signal. (Author)

PAT-APPL-6-170 492 PC **A02**/MF **A01**
Department of the Navy Washington DC
Array Convolver/Correlator.
Patent Application,
James W. Bond. Filed 21 Jul 80, 25p AD-D007 447/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An array convolver and/or correlator comprises first and second two-dimensional shift registers defined by N rows and M columns, corresponding columns, the first, the second, etc., of the two registers being aligned. N and M are generally in the range of 4 to 512. Data is capable of entering at least one of the left or right columns of each of the two shift registers. The data shifts downward to the bottom row in the first, upper, shift register and upward to the top row in the second, lower, shift register. A plurality of M analog multipliers each has an input from corresponding, aligned columns of each of the two registers. An analog summer has M inputs, one from each of the multipliers. The output of the summer is a correlation or convolution, depending upon which specific columns the data enters. (Author)

PATENT-4 196 359
Not available NTIS
Department of Energy, Washington, DC.
Differentially-Charged and Sequentially-Switched Square-Wave Pulse Forming Network.
Patent,
G. G. North, and G. E. Vogilin. Filed 8 Jun 78, patented 1 Apr 80, 6p PAT-APPL-913 634
Supersedes PAT-APPL-913 634-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A pulse forming network for delivering a high-energy square-wave pulse to a load, including a series of inductive-capacitive sections wherein the capacitors are differentially charged higher further from the load. Each charged capacitor is isolated from adjacent sections and the load by means of a normally open switch at the output of each section. The switch between the load and the closest section to the load is closed to begin discharge of the capacitor in that section into the load. During discharge of each capacitor, the voltage thereacross falls to a predetermined potential with respect to the potential across the capacitor in the next adjacent section further from the load. When this potential is reached, it is used to close the switch in the adjacent section further from the load and thereby apply the charge in that section to the load through the adjacent section toward the load. Each successive section further from the load is sequentially switched in this manner to continuously and evenly supply energy to the load over the period of the pulse, with the differentially charged capacitors providing higher potentials away from the load to compensate for the voltage drop across the resistance of each inductor. This arrangement is low in cost and yet provides a high-energy pulse in an acceptable square-wave form. (ERA citation 05:034054)

PB81-106668 PC **A02**/MF **A01**
Washington State Univ., Pullman. Dept. of Electrical Engineering.
Environmental Effects on Electrical Transmission Lines.
Final rept.,
Robert G. Olsen. Jan 80, 6p NOAA-80090905
Grant NOAA-04-78-B01-24

This final report is a collection of abstracts of the following papers: R. G. Olsen and A. Aburwein, 'Current induced on a pair of wires above earth by a vertical electric dipole for grazing angles of incidence' - Submitted to Radio Science, October 27, 1979; R. G. Olsen and A. Aburwein, 'Induced current on an infinite horizontal wire above earth by a cloud to ground lightening discharge' - Submited to IEEE transactions on Antennas and Propagation, Jan. 30, 1979; and R. G. Olsen and D. C. Change, 'Reply to new representation for the current in a horizontal wire above ground' - Electronics Letters, 30 August, 1979, Vol 15, no 18, p 556-557.

10.

ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

DOE/EIA/10157-T1 PC **A03**/MF **A01**
Maine Office of Energy Resources, Augusta.
State of Maine Office of Energy Resources Weekly Price Monitoring System End of Survey of Report. 2ND Annual Report to Region I DOE.
42p
Contract FC01-79EI10157

The OPEC oil embargo of 1973-1974 brought the nation to a realization of the importance and necessity for collection and analysis of energy data. The Maine Office of Energy Resources, (OER), has the responsibility to establish and implement energy policies in Maine. The Weekly Price Monitoring System, (PMS), has been developed and implemented to assist energy planners in Maine. This survey is used to analyze home heating oil price trends and as a public relations tool in response to inquiries from citizens, other federal, state and local agencies and the Governors Office. This report will describe the PMS and results obtained from this system during the period starting December 12, 1978 and ending June 4, 1979, (26 weeks). Also the price of home heating oil on November 1, 1978 is given as required in agreement number DE-FC01-79EI10157 between the US Department of Energy and the Maine Office of Energy Resources. (ERA citation 05:031582)

DOE/RA/04934-12 PC **A03**/MF **A01**
Franklin Pierce Law Center, Concord, NH. Energy Law Inst.
Legal Obstacles and Incentives to the Development of Small Scale Hydroelectric Power in New Hampshire.
May 80, 49p
Contract AS02-78RA04934

The legal and institutional obstacles to the development of small-scale hydroelectric energy at the state level are described. The Federal government also exercises extensive regulatory authority in the area and the dual regulatory system from the standpoint of the appropriate legal doctrine, the law of pre-emption, application of the law to the case of hydroelectric development, and an inquiry into the practical use of the doctrine by the FERC is examined. The first step any developer must take is that of acquiring the real estate parcel. The step involves acquisition in some manner of both river banks, the river bed, and where necessary the land needed for the upstream impoundment area. The developer must acquire the river banks to be considered a riparian owner. Classification as a riparian is important for only a use of water by a riparian owner is deemed a reasonable use and hence legal. Apart from acquisition by sale, lease, or gift, New Hampshire law permits a number of other methods. In part use of these methods will depend on whether the developer is the state, a municipality, a private corporation, or a public utility. Provided the developer avails himself of the five (5) megawatts exemption, his main regulatory agency will be the Water Resources Board. However, the state is not free from the problems of legal uncertainty inherent in determinations of reasonableness. (ERA citation 05:031748)

DOE/RA/04934-13 PC **A06**/MF **A01**
Franklin Pierce Law Center, Concord, NH. Energy Law Inst.
Legal Obstacles and Incentives to the Development of Small Scale Hydroelectric Power in Delaware.
May 80, 110p
Contract AS02-78RA04934

The legal and institutional obstacles to the development of small-scale hydroelectric energy at the state level are discussed. The Federal government also exercises extensive regulatory authority in the area, and the dual regulatory system from the standpoint of the appropriate legal doctrine, the law of pre-emption, application of the law to the case of hydroelectric development, and an inquiry into the practical use of the doctrine by the FERC is examined. In Delaware, a watercourse is not to be confused with surface water. Each gives rise to certain riparian rights, but the law makes certain distinctions between the two. The presence of both surface waters and watercourses give rise to private and public rights related to the presence of the water. Some of these rights are vested in riparian owners. Recent Delaware case law has described the riparian owner as one who owns land on the bank of a river, or who is owner of land along, bordering upon, bounded by, fronting upon, abutting, or adjacent and contiguous to and in contact with a river. But, ownership of the bank does not give the riparian ownership of the water. Some law cases are cited to discuss the laws in Delaware. (ERA citation 05:031749)

DOE/RA/04934-14 PC **A07**/MF **A01**
Franklin Pierce Law Center, Concord, NH. Energy Law Inst.
Legal Obstacles and Incentives to the Development of Small Scale Hydroelectric Power in New York.
May 80, 127p
Contract AS02-78RA04934

The legal and institutional obstacles to the development of small-scale hydroelectric energy at the state level are discussed. The Federal government also exercises extensive regulatory authority in the area, and the dual regulatory system from the standpoint of the appropriate legal doctrine, the law of pre-emption, application of the law to the case of hydroelectric development, and an inquiry into the practical use of the doctrine by the FERC is examined. The first step the small scale hydroelectric developer must take is that of acquiring title to the real property comprising the development site. The real estate parcel must include the requisite interest in the land adjacent to the watercourse, access to the underlying streambed and where needed, the land necessary for an upstream impoundment area. Land acquisition may be effectuated by purchase, lease, or grant by the state. In addition to these methods, New York permits the use of the eminent domain power of the state for public utilities under certain circumstances. (ERA citation 05:031750)

DOE/RA/04934-17 PC **A04**/MF **A01**
Franklin Pierce Law Center, Concord, NH. Energy Law Inst.
Legal Obstacles and Incentives to the Development of Small Scale Hydroelectric Power in Pennsylvania.
May 80, 71p
Contract AS02-78RA04934

The legal and institutional obstacles to the development of small-scale hydroelectric energy at the state level are discussed. The Federal government also exercises extensive regulatory authority in the area, and the dual regulatory system from the standpoint of the appropriate legal doctrine, the law of pre-emption, application of the law to the case of hydroelectric development, and an inquiry into the practical use of the doctrine by the FERC is examined. In Pennsylvania, there are 3 methods by which rights in water may be acquired: riparian ownership, prescription, and condemnation. These are discussed. (ERA citation 05:031752)

INIS-mf-5595 PC **A02**/MF **A01**
Oslo Univ. (Norway).
Earth's Energy Resources.
I. T. Rosenqvist. 1978, 9p
In Norwegian.
U.S. Sales Only.

The popular concept that scarce resources must be conserved rather than exploited is challenged. It is pointed out that geological material is not divided into two categories, stone and ore, but contains resources in varying concentrations. Only those concentrations economically recoverable are at any given time regarded as reserves. The illustration of resources in the form of cones where the distance down from the apex represents the work invested and the cross-section area the amount recoverable, is presented. Energy resources have an additional feature, that the energy obtained must exceed appreciably the energy invested. This leads to the cone being modified to a pear-shaped body. The world's reserves of fossil fuels, especially petroleum and uranium and thorium are discussed in this context. (Atomindex citation 11:518714)

N80-31881/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Composite Rotor Blades for Large Wind Energy Installations.
A. Kussmann, J. Molly, and D. Muser. Apr 80, 14p NASA-TM-75822
Contract NASW-3198
Transl. Into English from Dfvlr-Nachr. (Germany, F.R.), Jun. 1979 p 40-44. Original Language Document Was Announced as A79-41235. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The design of large wind power systems in Germany is reviewed with attention given to elaboration of the total wind energy system, aerodynamic design of the rotor blade, and wind loading effects. Particular consideration is given to the development of composite glass fiber/plastic or carbon fiber/plastic rotor blades for such installations.

PB81-104457 Not available NTIS
National Bureau of Standards, Washington, DC.
The Solar Collector Industry and Solar Energy.
Final rept.,
W. L. Warnick, and J. E. Hill. Feb 80, 6p
Pub. in Monthly Energy Review, DOE-EIA Report 0035-02 (80), p1-6 Feb. 1978.

From a 1974 level of 1.3 million square feet, the production of solar collectors increased over tenfold to 13.9 million square feet in 1979 (based upon the first 8-months' data). However, shipments of the various types of collectors, while increasing overall, show sporadic growth patterns over the 5 1/2-year period. Furthermore, a 4-year period of exponential growth appears to have ended. Solar energy incident on the Nation's inventory of solar collectors during 1979 was less than 0.03 quadrillion British thermal units (Btu). It is estimated that during 1979 the usable energy-output from solar collectors in the United States was about 0.008 quadrillion Btu. between 0.01 and 0.02 percent of domestic energy consumption.

PB81-105082 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
The NBS Energy Model Assessment Project: Summary and Overview,
S. I. Gass, K. L. Hoffman, R. H. F. Jackson, L. S. Joel, and P. B. Saunders. Sep 80, 43p NBSIR-80-2128
Sponsored in part by Department of Energy, Washington, DC.

This report is a summary of the activities and technical reports for the Energy Model Validation Procedure Development project undertaken by the Operations Research Division for the Department of Energy, using DOE's Midterm Oil and Gas Supply Modeling System (MOGSM) as a test vehicle. The reports cover: (1) assessment of the documentation of MOGSM; (2) analysis of (a) the model methodology, (b) characteristics of the input and other supporting data, (c) statistical procedures undergirding construction of the model, and (d) sensitivity of the outputs to variations in input; as well as (3) guidelines and recommendations for the role of these in model building and developing procedures for their evaluation.

PB81-107971 PC **A13**/MF **A01**
Bureau of Land Management, Los Angeles, CA. Pacific Outer Continental Shelf Office.
Proposed 1979 Outer Continental Shelf Oil and Gas Lease Sale Offshore Southern California. OCS Sale No. 48. Volume 4.
Final environmental statement.
Jan 79, 287p BLM/YN/ES-79/04
See also PB80-201742.

The Environmental Statement considered all available data and evaluated potential effects of the proposed sale which might occur during exploration, development, and production of mineral resources.

SERI/TP-733-698 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Implementing State Solar Financial Incentives and RD and D Programs.
J. D. Roessner. May 80, 23p CONF-800635-2
Contract AC02-77CH00178
Conference of the American Society of Heating, Refrigeration and Air Conditioning Engineers, Denver, CO, USA, 2" Jun 1980.

The following subjects are discussed: changing federal-state relationships in energy, state and federal policy concerns in solar and renewable energy, the framework of research on the policy implementation process, description of state solar financial incentive programs, effects of state background conditions on implementation of financial incentive programs, the effect of organizational and administrative factors on implementation of state solar financial programs, description of RD and D programs in selected states, background characteristics and the implementation of RD and D programs, and the effect of organizational and administrative factors on implementation of state solar RD and D programs. (ERA citation 05:031785)

10B. Power Sources

AD-A089 216/6 PC **A04**/MF **A01**
Wisconsin Univ-Madison Dept of Chemistry
Luminescent Photoelectrochemical Cells. 2. Doped Cadmium Sulfide Photoelectrodes as Probes of Excited-State Processes Which Influence Optical to Electrical Energy Conversion.
Technical rept.,
Bradley R. Karas, and Arthur B. Ellis. 12 Aug 80, 62p Rept no. TR-2
Contract N00014-78-C-0633

The use of photoelectrochemical cells (PECs) to mediate the direct conversion of optical energy to electricity is receiving widespread attention. Typical PECs consist of an n-type semiconductor photoanode, a counterelectrode and the electrolyte. The key elements are the semiconductor which functions in the dual roles of photoreceptor and electrode, and the electrolyte which must possess the important features of inhibiting the photocorrosion of the semiconductor. A variety of PECs have now been constructed using these principles and the goal of researchers in the field in generally to optimize the efficiency and longevity of such devices. This report discusses a promising avenue to optimizing efficiency involves characterization of the excited state processes governing the semiconductor electrode. Deactivation of the excited electrode to produce photocurrent and, hence, electricity is only one of several decay paths available.

AD-A089 217/4 PC **A03**/MF **A01**
Wisconsin Univ-Madison Dept of Chemistry
Thermal Manipulation of Deactivation Processes in Luminescent Photoelectrochemical Cells Employing Tellurium-Doped Cadmium Sulfide Photoelectrodes.
Technical rept.,
Bradley R. Karas, David J. Morano, Daniel K. Bilich, and Arthur B. Ellis. 12 Aug 80, 29p Rept no. TR-4
Contract N00014-78-C-0633

Temperature significantly modifies the efficiencies of luminescence and photocurrent in an n-type,

single crystal, CdS:Te-based photoelectrochemical cell (PEC) employing aqueous polyselenide electrolyte. Between 20 and 100 C photocurrent (quantum yield phi sub x) from ultraband gap 501.7 nm excitation increases modestly by less than or = 20%, whereas photocurrent from bandgap edge 514.5 nm excitation increases by about an order of magnitude, reaching 50-100% of the 20 C 501.7 nm photocurrent. Undoped CdS exhibits a similar photocurrent-temperature profile. Higher temperatures thus extend the wavelength response of CdS- and CdS:Te-based PEC's. In contrast to the increase in photocurrent, emissive efficiency (quantum yield phi sub r) of CdS:Te drops by a factor of approximately 10-20 over the same temperature range; this decline is relatively insensitive to potential and excitation wavelength (501.7 or 514.5 nm).

AD-A089 298/4 PC **A03**/MF **A01**
Varo Inc Garland TX Texas Div
Generator Exhaust Signature Suppression (GESS) System Mounting Adapters for the 15 Kw and 30 Kw DOD Diesel Engine Generators.
Final rept.,
Robert E. Wallace. Jun 80, 44p Rept no. TD-75297
Contract DAAK70-79-C-0207

This development was for 2 adapters to allow mounting of the Generator Exhaust Signature Suppression System (GESS) duct to 15 kw and 30 kw diesel driven generators. Adapters are mountable on these generators without any modification to the generators except removal of 13 bolts and the weather cap. Use of both adapters mounts the GESS duct in a horizontal attitude so that no hot parts of the duct are seen above a horizontal plane through the duct.

DOE/CS/20097-01 PC **A11**/MF **A01**
Raytheon Service Co., Arlington, VA.
Wind Energy Systems: Program Summary.
May 80, 237p
Contract AC01-78ET20097

The Federal Wind Energy Program (FWEP) was initiated to provide focus, direction and funds for the development of wind power. Each year a summary is prepared to provide the American public with an overview of government sponsored activities in the FWEP. This program summary describes each of the Department of Energy's (DOE) current wind energy projects initiated or renewed during FY 1979 (October 1, 1978 through September 30, 1979) and reflects their status as of April 30, 1980. The summary highlights on-going research, development and demonstration efforts and serves as a record of progress towards the program objectives. It also provides: the program's general management structure; review of last year's achievements; forecast of expected future trends; documentation of the projects conducted during FY 1979; and list of key wind energy publications. (ERA citation 05:032164)

DOE/SF/10740-1(V.1) PC **A16**/MF **A01**
El Paso Electric Co., TX.
Newman Unit 1 Solar Repowering. Final Report.
Jul 80, 367p
Contract AC03-79SF10740

The principal objective of this study was to develop a conceptual design and cost estimate for solar repowering El Paso Electric Company's Newman Unit 1 that has the potential for construction and operation by 1985, makes use of existing solar thermal technology, and provides the best economics for this application. Specific objectives were: (1) to prepare a systems specification for solar repowering Newman Unit 1, (2) to select a preferred configuration and prepare a conceptual design, (3) to establish the performance and economic attractiveness of solar repowering design, and (4) to prepare a development plan for a demonstration program at Newman Station. This volume contains the detailed conceptual design, economic analysis, and development plan. The preferred system consists of a 160 exp 0 array of heliostats and an advanced water/steam receiver. (ERA citation 05:034697)

DOE/SF/10741-1(V.1) PC **A15**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
Southwestern Public Service Company Solar Repowering Program. Volume 1. Conceptual Design and Evaluation. Final Technical Report.
Jul 80, 339p
Contract AC03-79SF10741

The detailed conceptual design, subsystem characteristics, economic analysis, development plan, and user's assessment of repowering Southwest Public Service Company's Plant X located south of Amarillo, Texas, with a tower focus power plant are presented. The plant will utilize liquid sodium heat transfer fluids, thermal storage tanks, and a steam generator/turbine. Detailed economic and cost data are included. (ERA citation 05:034702)

INIS-mf-5594 PC **A02**/MF **A01**
Statens Vattenfallsverk, Stockholm (Sweden).
Thermal Power in the Swedish Energy Supply.
S. Lalander. 1978, 24p
In Swedish.
U.S. Sales Only.

A survey is presented of the part played by thermal power plants including nuclear plants in the Swedish electric power supply system. The Swedish and Norwegian situations are compared. The background for the present structure is outlined and the optimisation of electricity production is briefly discussed. The Nordic grid is presented and the strategy and charges discussed. The prognosis for the development in Sweden is presented with a brief discussion of the influence of industrial development. Finally the responsibility of the politicians for the continued development is discussed. (Atomindex citation 11:518708)

N80-31869/4 PC **A13**/MF **A01**
United Technologies Corp., South Windsor, CT. Power Systems Div.
Cogeneration Technology Alternatives Study (CTAS). Volume 3: Energy Conversion System Characteristics.
Final Report.
Jan 80, 283p NASA-CR-159761, DOE/NASA/0030-80/3-V-3
Contracts DEN3-30, EC-77-A-31-1062

Six current and thirty-six advanced energy conversion systems were defined and combined with appropriate balance of plant equipment. Twenty-six industrial processes were selected from among the high energy consuming industries to serve as a frame work for the study. Each conversion system was analyzed as a cogenerator with each industrial plant. Fuel consumption, costs, and environmental intrusion were evaluated and compared to corresponding traditional values. The advanced energy conversion technologies indicated reduced fuel consumption, costs, and emissions. Fuel energy savings of 10 to 25 percent were predicted compared to traditional on site furnaces and utility electricity. With the variety of industrial requirements, each advanced technology had attractive applications. Fuel cells indicated the greatest fuel energy savings and emission reductions. Gas turbines and combined cycles indicated high overall annual savings. Steam turbines and gas turbines produced high estimated returns. In some applications, diesels were most efficient. The advanced technologies used coal derived fuels, or coal with advanced fluid bed combustion or on site gasifications. Data and information for both current and advanced energy conversion technology are presented. Schematic and physical descriptions, performance data, equipment cost estimates, and predicted emissions are included. Technical developments which are needed to achieve commercialization in the 1985-2000 period are identified.

N80-31870/2 PC **A21**/MF **A01**
General Electric Co., Philadelphia, PA. Thermal Power Systems Engineering.
Cogeneration Technology Alternatives Study (CTAS). Volume 3: Industrial Processes.
Final Report.
W. B. Palmer, H. E. Gerlaugh, and R. R. Priestley. Apr 80, 478p NASA-CR-159767, DOE/NASA/0031-80/3-V-3
Contract DEN3-31
Sponsored by DOE.

Cogenerating electric power and process heat in single energy conversion systems rather than separately in utility plants and in process boilers is examined in terms of cost savings. The use of various advanced energy conversion systems are examined and compared with each other and with current technology systems for their savings in fuel energy, costs, and emissions in individual plants and on a national level. About fifty industrial processes from the target energy consuming sectors were used as a basis for matching a similar number of energy conversion systems that are considered as candidate which can be made available by the 1985 to 2000 time period. The sectors considered included food, textiles, lumber, paper, chemicals, petroleum, glass, and primary metals. The energy conversion systems included steam and gas turbines, diesels, thermionics, stirling, closed cycle and steam injected gas turbines, and fuel cells. Fuels considered were coal, both coal and petroleum based residual and distillate liquid fuels, and low Btu gas obtained through the on site gasification of coal. An attempt was made to use consistent assumptions and a consistent set of ground rules specified by NASA for determining performance and cost. Data and narrative descriptions of the industrial processes are given.

N80-31871/0 PC **A03**/MF **A01**
California Univ., Los Angeles.
Silicon Solar Cell Fabrication Technology.
Final Report.
O. M. Stafsudd. 15 May 80, 37p NASA-CR-163394, JPL-9950-386
Contract JPL-954902
Sponsored by NASA and DOE Prepared for JPL.

Device fabrication and photoconductive lifetime decay measurements were used to characterize single and polycrystalline silicon substracts. The device characterization of the processed materials was done by spectral response measurements and absolute quantum efficiency at a single wavelength. The results were then reduced to yield the diffusion length of the various samples. The photoconductive lifetime decay method was implemented in order to determine the minority carrier lifetime in unprocessed wafers.

N80-31873/6 PC **A07**/MF **A01**
AeroChem Research Labs., Inc., Princeton, NJ.
Development of a Model and Computer Code to Describe Solar Grade Silicon Production Processes.
Final Report, 21 Sep. 1977 - 30 Sep. 1979.
R. K. Gould, and R. Srivastava. Dec 79, 126p NASA-CR-163515, AEROCHEM-TP-392
Contract JPL-954862
Sponsored in Part by DOE.

Two computer codes were developed for describing flow reactors in which high purity, solar grade silicon is produced via reduction of gaseous silicon halides. The first is the CHEMPART code, an axisymmetric, marching code which treats two phase flows with models describing detailed gas-phase chemical kinetics, particle formation, and particle growth. It can be used to described flow reactors in which reactants, mix, react, and form a particulate phase. Detailed radial gas-phase composition, temperature, velocity, and particle size distribution profiles are computed. Also, deposition of heat, momentum, and mass (either particulate or vapor) on reactor walls is described. The second code is a modified version of the GENMIX boundary layer code which is used to compute rates of heat, momentum, and mass transfer to the reactor walls. This code lacks the detailed chemical kinetics and particle handling features of the CHEMPART code but has the virtue of running much more rapidly than CHEMPART, while treating the phenomena occurring in the boundary layer in more detail.

N80-31875/1 PC **A06**/MF **A01**
Sanders Associates, Inc., Nashua, NH. Energy Systems Center.
Small Solar Electric System Components Demonstration.
Final Report.
Aug 80, 123p NASA-CR-163513
Contract JPL-955279
Original Contains Color Illustrations.

The design and testing of high temperature thermal storage modules (TSM) are reported. The test

goals were to demonstrate the thermocline propagation in the TSM, to measure the steepness of the thermocline, and to measure the effectiveness of the TSM when used in a Brayton system. In addition, a high temperature valve suitable for switching the TSM at temperatures to 1700 F is described and tested. Test results confirm the existence of a sharp thermocline under design conditions. The thermal profile was steeper than expected and was insensitive to air density over the range of the test conditions. Experiments were performed which simulated the airflow of a small Brayton engine, 20 KWe, having a pair of thermal storage modules acting as efficient recuperators. Low pressure losses, averaging 12 inches of water, and high effectiveness, 93% for a 15 minute switching cycle, were measured. The insulation surrounding the ceramic core limited thermal losses to approximately 1 KWt. The hot valve was operated over 100 cycles and performed well at temperatures up to 1700 F.

N80-31876/9 PC **A04**/MF **A01**
Solarex Corp., Rockville, MD.
Pilot Line Report: Development of a High Efficiency Thin Silicon Solar Cell.
G. Storti, J. Culik, and C. Wrigley. Jul 80, 55p
NASA-CR-163522, SX/115/PL-2
Contract JPL-954883
Prepared for JPL.

Alternate processing technologies were developed and introduced into the pilot line with a resulting increase in the efficiency of the thin cells. The introduction of an aluminum paste alloy technique for the formation of a back surface field represents a significant advance over previous techniques. The fabrication and results for quantities in excess of 2000 2 cm x 2 cm thin cells and 1000 5 cm x 5 cm thin cells are described. Substantial improvement in performance and yield of the thin cells were obtained. The overall yield of the 2 cm x 2 cm pilot line was better than 38%, while the best lot yield was greater than 51%. The average power density of the 2 cm x 2 cm cells was approximately 16.8 mW/sq cm with an average AMO (at 25 C) efficiency of 12.4%. The lot yield of the 5 cm x 5 cm pilot line improved from only 7% at the beginning of the operation to better than 17% as experience was gained. The average 5 cm x 5 cm thin cell had an AMO efficiency (at 25 C) of 11.5%.

N80-31877/7 PC **A07**/MF **A01**
Motorola, Inc., Chicago, IL.
Photovoltaic Module Electrical Termination Design Requirement Study.
Final Report.
F. J. Mosna, Jr., and J. Donlinger. Jul 80, 150p
JPL-955367-80/1, NASA-CR-163518
Contracts JPL-955367, JPL PROJ. 2369
Prepared for JPL.

Pertinent electrical termination attributes were identified and used in the development of selection criteria which included function, environmental durability, utility, manufacturing, code, and cost. Significant aspects of each criteria are discussed, and eight different types of terminations are ranked according to their performance in remote, residential, intermediate, and industrial applications.

N80-31882/7 PC **A04**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Cell Module and Fuel Conditioner.
Quarterly Report, Apr. - Jun. 1980.
D. Q. Hoover, Jr. Jul 80, 75p NASA-CR-159888, DOE/NASA/0161-4
Contracts DEN3-161, DE-AI 03-79ET-11272

The computer code for the detailed analytical model of the MK-2 stacks is described. An ERC proprietary matrix is incorporated in the stacks. The mechanical behavior of the stack during thermal cycles under compression was determined. A 5 cell stack of the MK-2 design was fabricated and tested. Designs for the next three stacks were selected and component fabrication initiated. A 3 cell stack which verified the use of wet assembly and a new acid fill procedure were fabricated and tested. Components for the 2 kW test facility were received or fabricated and construction of the facility is underway. The definition of fuel and water is used in a study of the fuel conditioning subsystem. Kinetic data on several catalysts, both crushed and pellets, was obtained in the differential reactor. A preliminary definition of the equipment requirements for treating tap and recovered water was developed.

N80-31884/3 PC **A04**/MF **A01**
Old Dominion Univ., Norfolk, VA. Dept. of Mathematical Sciences.
Gallium Arsenide (GaAs) Solar Cell Modeling Studies.
Final Report, 16 May - 16 Aug. 1980.
J. H. Heinbockel. Sep 80, 55p NASA-CR-163538
Contract NAG1-64

Various models were constructed which will allow for the variation of system components. Computer studies were then performed using the models constructed in order to study the effects of various system changes. In particular, GaAs and Si flat plate solar power arrays were studied and compared. Series and shunt resistance models were constructed. Models for the chemical kinetics of the annealing process were prepared. For all models constructed, various parametric studies were performed.

N80-31890/0 PC **A12**/MF **A01**
Rockwell International Corp., Downey, CA.
Satellite Power Systems (SPS) Concept Definition Study. Volume 2, Part 1: System Engineering.
Final Report.
G. M. Hanley. Sep 80, 258p NASA-CR-3318, SSD-79-0010-2-1
Contract NAS8-32475
7.

Top level trade studies are presented, including comparison of solid state and klystron concepts, higher concentration on the solar cells, composite and aluminum structure, and several variations to the reference concept. Detailed trade studies are presented in each of the subsystem areas (solar array, power distribution, structures, thermal control, attitude control and stationkeeping, microwave transmission, and ground receiving station). A description of the selected point design is also presented.

N80-31891/8 PC **A13**/MF **A01**
Rockwell International Corp., Downey, CA.
Satellite Power Systems (SPS) Concept Definition Study. Volume 4: Transportation Analysis.
Final Report.
G. M. Hanley. Sep 80, 292p NASA-CR-3321, SSD-79-0010-4-V-4
Contract NAS8-32475

Transportation system elements were synthesized and evaluated on the basis of their potential to satisfy overall satellite (SPS) transportation requirements and of their sensitivities, interfaces, and impact on the SPS. Additional analyses and investigations were conducted to further define transportation system concepts that will be needed for the developmental and operational phases of an SPS program. To accomplish these objectives, transportation systems such as shuttle and its derivatives have been identified; new heavy lift launch vehicle concepts, cargo and personnel orbital transfer vehicles and intra-orbit transfer vehicle concepts have been evaluated. To a limited degree, the program implications of their operations and costs were assessed. The results of these analyses have been integrated into other elements of the overall SPS concept definition studies.

N80-31951/0 PC **A05**/MF **A01**
Argonne National Lab., IL. Integrated Assessments and Policy Evaluations Group.
Methodology for the Comparative Assessment of the Satellite Power System (SPS) and Alternative Technologies.
T. Woisko, W. Buehring, R. Cirillo, J. Gasper, and L. Habegger. Jan 80, 79p NASA-CR-163049, DOE/ER-0051
Contract W-31-109-ENG-38
Sponsored by NASA.

The energy systems concerned are the satellite power system, several coal technologies, geothermal energy, fission, fusion, terrestrial solar systems, and ocean thermal energy conversion. Guidelines are suggested for the characterization of these systems, side-by-side analysis, alternative futures analysis, and integration and aggregation of data. A description of the methods for assessing the technical, economic, environmental, societal, and institutional issues surrounding the development of the selected energy technologies is presented.

N80-31962/7 PC **A02**/MF **A01**
Centro Informazioni Studi Esperienze, Milan (Italy). Servizio Documentazione.
Gallium Arsenide Solar Cells for Very High Concentration Systems: Recent Results, Problems and Expectations Celle Solari All'Arseniuro di Gallio Per Sistemi AD Altissima Concentrazione: Risultati Recenti, Problemi E Prospettive.
G. Guarini. Oct 79, 12p CISE-1518
Text in Italian. Presented at Conf. On Conversione Foltovoltaica Dell'Energia Solar, Milan, 18-19 Oct. 1979.

The state-of-the-art of solar cell research for use under highly concentrated solar radiation is reviewed. The application of GaAlAs-GaAs cells, systems using thermal recovery, and research on multi-energy levels are discussed. It is concluded that high concentration systems based on GaAlAs multicolor cells with efficiency over 30% appear to be attractive and economically feasable solutions. The three junction monolithic cell (efficiency 40-45%) is an important research goal.

N80-32223/3 PC **A03**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Physics.
Interaction of High Voltage Surfaces with the Space Plasma.
Annual Report.
H. R. Kaufman, and R. S. Robinson. May 80, 50p
NASA-CR-165131
Grant NSG-3196

High voltage solar arrays provide spacecraft power while optimizing mass and power efficiency. Operating such arrays in the space plasma environment can result in anomalously large currents being collected through insulation defects. Two thicknesses of the insulating material were tested, with no effect found due to insulator thickness. In these tests the polyimide thickness was always much less than the pinhole diameter. The pinhole area was varied over an area range of more than 30:1. It was found that the current collected was independent of the pinhole area for hole diameters from 0.35 to 2.0 mm. Two types of adhesives were tried in two different configurations. The adhesives were chosen for their extreme difference in vacuum qualifications. Neither adhesive types nor configuration made a significant difference in current collection. The temperature of the insulating material was also varied. It was found that current collection decreased with increasing temperature. Tests were conducted to see if pinhole current collection decreased with time, as was indicated by the effects of several short tests. Current was collected for over four hours while the conductor potential was held constant at 1000 volts. A smooth decrease with time was not observed, but rather a roughly constant current collection with brief surges to high values. Tests were also conducted with the simulated solar cell biased negative. The current was found to be proportional to pinhole area.

PB81-104663 PC **A18**/MF **A01**
Water and Power Resources Service, Denver, CO. Engineering and Research Center.
Report on Assessment of Small Hydroelectric Development at Existing Facilities.
Jul 80, 420p

This report contains the results of an assessment by the Water and Power Resources Service of opportunities to develop small hydroelectric powerplants at existing Water and Power water resource development projects. As an indication for the need of additional power and energy supplies, the report displays the 10-year forecasts of electrical power and energy demands of the National Electrical Reliability Council. A total of 159 potential small hydroelectric developments were evaluated using an iterative process of analysis and screening. A basic assumption was that existing reservoir oper-

ations and existing flow regimes would remain unchanged with development. As a result of the analysis and screening, 46 sites were identified as being economically feasible. Data on possible environmental and social impacts and public acceptability were gathered for these 46 sites. A final evaluation was based on economic, environmental, social, and acceptability factors. Based on the data available, it was concluded that the development of 37 of the 46 selected sites would result in no significant environmental and social impacts and would be acceptable to and supported by the affected publics.

PB81-104937 PC **E03**/MF **E03**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
Effects of Accounting Rules on Utility Choices of Energy Technologies in the United States.
Final rept.,
Bernard I. Spinrad. Jul 80, 29p RR-80-27

Monetary inflation does not change the values of commodities relative to each other, only the value of money relative to commodities. Therefore, it would be expected that a comparison of the cost of technological options would not be inflation-dependent. This is borne out by the fact that when systems are compared using three different methods: (a) reducing all costs to constant-value currency and applying inflation-free discount rates; and (c) levelizing future costs at prevalent discount rates; the same relative cost figures are obtained. These three methods are used to compare five systems that supply electrical power: Light-water reactors (LWR); Liquid-metal fast-breeder reactors (LMFBR); Coal plants, with scrubbers, burning low-sulfur or processed high-sulfur coal (CS); Coal plants, with fluidized-bed combustion of high-sulfur coal (CFB); Solar power plants with sufficient storage for base-load use (SS).

PB81-800021 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Hydrocarbon Fuel Cells. 1967-July, 1980 (Citations from the American Petroleum Institute Data Base).
Rept. for 1967-Jul 80,
Diane M. Cavagnaro. Oct 80, 135p
Supersedes NTIS/PS-79/0718, and NTIS/PS-78/0651.

This bibliography cites worldwide research on hydrocarbon fuel cells. The citations cover applications, design, performance, fabrication, catalysts, and electrochemistry. (This updated bibliography contains 130 citations, 2 of which are new entries to the previous edition.)

10C. Energy Storage

AD-A089 281/0 PC **A04**/MF **A01**
Duracell International Inc Burlington MA Lab for Physical Science
Lithium-Thionyl Chloride Battery.
Quarterly rept. no. 6. 1 Feb-30 Apr 80,
A. N. Dey, N. Hamilton, W. Bowden, P. Witalis, and D. Cubbison. Sep 80, 53p DELET-TR-78-0563-6
Contract DAAB07-78-C-0563

We have delivered 100 D cells to the sponsor. The cell has also been tested for capacity retention after abusive storage at 72 degrees C. We demonstrated the safety of the flat cylindrical cell during over discharge and voltage reversal at the 3.2A and 20A rates of the GLLD cell. We also studied the rate capability retention of the flat cell after storage. (Author)

N80-31886/8 PC **A02**/MF **A01**
Naval Weapons Support Center, Crane, IN.
Evaluation Program for Secondary Spacecraft Cells: Initial Evaluation Tests of General Electric Company 6.0 Ampere Hour Nickle Cadmium Spacecraft Cells for the Dynamic Explorer Satellite Program.
J. D. Harkness. 9 Apr 80, 18p NASA-CR-160014, WQEC/C-80-128
NASA ORDER S-57075-AG

Evaluation tests of 10 nickel cadmium cells are described. Although pressures were greater than what normally was exhibited by General Electric cells in the past, it is recommended that these cells be placed on life test simulating the predicted Dynamic Explorer flight profiles.

N80-31887/6 PC **A04**/MF **A01**
Naval Weapons Support Center, Crane, IN.
Initial Evaluation Tests of 20.0 Amphere-Hour Sealed Nickel-Cadmium Cells Manufactured for NASA's Standard Cell Program.
J. D. Harkness. 9 May 79, 61p NASA-CR-160015, WQEC/C-79-144
NASA ORDER S-57075-AG

Evaluation tests of 116 nickel cadmium cells provided by four manufacturers are described. Each manufacturer's group of cells, on the average, indicated an increase in plate stack thickness following the test. No limits or requirements were exceeded by any of the cells manufactured by General Electric. Limits/requirements exceeded during the charge portion of the testing are given.

N80-31888/4 PC **A02**/MF **A01**
Naval Weapons Support Center, Crane, IN.
Evaluation Program for Secondary Spacecraft Cells: Initial Evaluation Tests of General Electric Company 40.00 Ampere-Hour Nickel-Cadmium Spacecraft Cells for the Tracking Data Relay Satellite System.
J. D. Harkness. 21 Dec 78, 17p NASA-CR-160016, WQEC/C-78-416
NASA ORDER S-53742-AG

Five cells provided by NASA's Goddard Space Flight Center were evaluated at room temperature and pressure (25 C plus or minus 2 C) with discharges at the 2 hour rate. Measurements of the cell containers following test, indicated an average increase of .006 inches at the plate thickness. Average end of charge voltages and pressures, and capacity output in ampere hours were determined. Three cells exceeded the voltage requirements of 1.52 volts during both c/10 charges at 20 C. All cells exceeded the voltage requirement of 1.52 volts during the 0 C overcharge test, although their end charges were below 1.50 volts. The pressure requirement of 65 psia was exceeded by both pressure transducer cells during c/10 charges at 25 C and 20 C and also during the 0 C overcharge test. The cells with pressure transducers reached a pressure of 20 psia before reaching the voltage limit of 1.550 volts during the pressure versus capacity test, and exhibited a pressure decay of 2 psia during the last 30 minutes of the 1 hour open circuit stand. Average capacity was 51.3 ampere hours.

N80-31889/2 PC **A02**/MF **A01**
Naval Weapons Support Center, Crane, IN.
Evaluation Program for Secondary Spacecraft Cells: Initial Evaluation Tests of General Electric Company 50.0 Ampere Hour Nickel Cadmium Spacecraft Cells for the Landsat-D Satellite Program.
J. D. Harkness. 9 Apr 80, 20p NASA-CR-160017, WQEC/C-80-104
NASA ORDER S-5707-AG

Evaluation tests of eight nickel cadmium cells are described. Although high cell pressures were observed, it is recommended that these cells be placed on a near orbit life test.

11. MATERIALS

11A. Adhesives and Seals

N80-31479/2 PC **A03**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
LARC-13 Adhesive Development.
Final Report, Oct. 1978 - Jun. 1980.
S. G. Hill, C. H. Sheppard, and J. C. Johnson. Jun 80, 50p NASA-CR-159317, REPT-2-3621
Contract NAS1-15562

A LARC-13 type adhesive system was developed and property data obtained that demonstrated improved thermomechanical properties superior to base LARC-13 adhesive. An improved adhesive for 589 K (600 F) use was developed by physical or chemical modification of LARC-13. The adhesive was optimized for titanium and composite bonding, and a compatible surface preparation for titanium and composite substrates was identified. The data obtained with the improved adhesive system indicated it would meet the 589 K (600 F) properties desired for application on space shuttle components. Average titanium lap shear data were: (1) 21.1 MPa (3355 psi) at RT, (2) 13.0 MPa (1881 psi) at 600 F, and (3) 16.4 MPa (2335) after aging 125 hours at 600 F and tested at 600 F.

N80-31797/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Simulation and Visualization of Face Seal Motion Stability by Means of Computer Generated Movies.
I. Etsion, and B. M. Auer. 1980, 19p NASA-TM-81581, E-554
Proposed for Presentation at the Fluid Sealing Conf., Leeuwenhorst, Holland, 1-3 Apr. 1980; Sponsored by the British Hydrodynamic Research Assoc.

A computer aided design method for mechanical face seals is described. Based on computer simulation, the actual motion of the flexibly mounted element of the seal can be visualized. This is achieved by solving the equations of motion of this element, calculating the displacements in its various degrees of freedom vs. time, and displaying the transient behavior in the form of a motion picture. Incorporating such a method in the design phase allows one to detect instabilities and to correct undesirable behavior of the seal. A theoretical background is presented. Details of the motion display technique are described, and the usefulness of the method is demonstrated by an example of a noncontacting conical face seal.

PATENT-4 213 004 Not available NTIS
Department of the Air Force Washington DC
Hermetic Electrical Feedthrough for Aluminum Housing and Method of Making Same.
Patent,
Roy M. Acker, and Kenneth Lui. Filed 30 Jun 78, patented 15 Jul 80, 4p AD-D007 436/9, PAT-APPL-921 138
Supersedes PAT-APPL-921 138-78, AD-D005 359.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A leak-tight joint between a Kovar ceramic feedthrough and an aluminum housing is obtained by electron beam welding a short length of the outside surface of the Kovar cylindrical shell of the feedthrough to a region of nickel deposited on a thin wall cylindrical tube of aluminum formed in the aluminum housing is disclosed.

11B. Ceramics, Refractories, and Glasses

AD-A089 499/8 PC **A08**/MF **A01**
Dayton Univ OH Research Inst
A Study to Determine the Effect of Glass Compositional Variations on Vibration Damping Properties.
Final technical rept. 15 Jan 76-31 Mar 80,
George A. Graves, Jr., Charles Cannon, and Binod Kumar. May 80, 174p UDR-TR-80-27, AFWAL-TR-80-4061

Contract F33615-76-C-5137

This report describes the results of an experimental investigation to determine the effects certain oxide additions have on the damping properties of a commercial glass (enamel) of known composition (Corning 0010) whose damping properties had previously been characterized. One of the aims of this investigation was to determine the effect the oxide additions had on the temperature at which peak damping occurred, singly and in combination. Past experience indicated the temperature of peak damping to be related to the viscosity of the glass. The results of this investigation indicated the temperature at which peak damping occurs (peak in the loss modulus curve) is related to the viscosity of the glass. Additions which made the glass more refractory (increased the viscosity of the glass) increased the temperature at which peak damping occurred. Additions which made the glass less refractory (lowered the viscosity of the glass) lowered the temperature at which peak damping occurred. The results of the investigation are presented in tabular and graphical form. (Author)

CEA-CONF-4687 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Technologie.
Graphite Corrosion by Water Vapor under Irradiation of an HTGR Fuel Element.
M. Brie, and A. Fillatre. 1979, 7p CONF-790625-10
In French.14. carbon conference, University Park, PA, USA, 25 Jun 1979.
U.S. Sales Only.

A HTGR type fuel sample was irradiated in OSIRIS reactor until 1.18 x 10 exp 22 n.cm exp -2 graphite damage flux. Conditions being similar to those in a power station working normally. Calculation of grahite weight loss versus time by application of Langmuir-Hinshelwood mechanism was undertaken by using partial pressure of water and hydrogen and surface temperatures of graphite. Computed wear corresponds to the very low corrosion measured after irradiation. (Atomindex citation 11:521159)

11C. Coating, Colorants, and Finishes

AD-A089 592/0 PC **A04**/MF **A01**
National Bureau of Standards Washington DC
Passive Films, Surface Structure and Stress Corrosion and Crevice Corrosion Susceptibility.
Annual rept. Nov 79-Aug 80,
J. Kruger, J. J. Ritter, J. J. Carroll, and A. J. Melmed. Aug 80, 51p Rept no. NBSIR-80-2101
Contract NAonr-18-69

A feasibility study was made to determine if qualitative ellipsometry can be used together with electrochemical pH and potential measurements as a technique for the study of metal substrates protected by transparent organic coatings. The objective of the work was to gain a deeper understanding of the mechanisms governing the corrosion protective actions of paints on metal surfaces. Computer modeling and experiments with collodion coatings on iron substrates indicated that changes in the ellipsometric parameter could, for the most part, be safely interpreted as thickness alterations in the substrate oxide film. Experiments with the Fe-collodion system in dilute chloride solutions exhibited three sequential stages of activity, two of which could be interpreted in terms of corrosion mechanisms using the optical and electrochemical measurements. Chromate ion as a corrosion inhibitor in coatings was also studied using this technique, and was shown to have significant effects upon the development of the sub-coating processes. (Author)

PAT-APPL-6-118 132 PC **A02**/MF **A01**
Department of the Navy Washington DC
Protective Coating.
Patent Application,
Brian A. Manty, and Vernon G. Anderson. Filed 4 Feb 80, 22p AD-D007 460/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Method and protective coating composition for preventing or minimizing combustion or melting of titanium and combustile alloys thereof. Two layers of coatings are applied, the first layer preventing diffusion of the second layer into the titanium or alloy even at elevated temperatures, and the second layer suppressing titanium combustion. The first layer contains chromium, molybdenum, niobium, tantalum, vanadium, zirconium, platinum, or rhodium or a combination thereof or alloy of any of these metals. The second layer contains copper, aluminum, gold, nickel, silver, cobalt or a combination thereof or alloy of any of these metals. By preventing diffusion of the second layer into the substrate, the first layer prevents degradation of substrate engineering or mechanical properties. When in an operating aircraft engine molten or burning titanium or other material arrives at the surface of the second layer, the second layer melts directly underneath the molten material which then is moved downstream by the engine airflow, leaving behind a non-melted substrate. (Author)

11D. Composite Materials

AD-A089 391/7 PC **A02**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
A Crack Opening Displacement Approach to Crack Patching,
R. Jones, and R. J. Callinan. Oct 79, 19p Rept no. ARL/STRUC NOTE-455

The results of a numerical investigation into crack patching indicate that a modified form of the crack opening displacement approach may be useful in estimating the effect that fibre composite patches have on cracks in thin sheets. (Author)

AD-A089 445/1 PC **A08**/MF **A01**
Massachusetts Inst of Tech Cambridge
Penetration Mechanics of Textile Structures.
Technical rept.,
David Roylance, and Su-Su Wang. Jun 79, 154p NATICK-TR-80/021, NATICK/CEMEL-218
Contract DAAG17-76-C-0013

This report reviews those aspects of wave propagation and dynamic fracture relevant to the penetration mechanics of textile structures intended for use in personnel ballistic protection, and then describes the development and implementation of numerical analyses for use in instances for which closed-form analyses are intractable. These numerical treatments are used to assess the manner in which fiber material properties influence ballistic resistance, and this is done by performing simulations of missile impact on four fabrics of actual interest: ballistic nylon, Kevlar 29, Kevlar 49, and graphite. Following this parametric materials study, the numerical treatment is extended to include the effect of linear and non-linear viscoelastic relaxation on fabric response to impact. Finally, a special purpose computer code is described which was developed to study stress wave effects occurring at fiber crossovers. (Author)

N80-31480/0 PC **A03**/MF **A01**
Celanese Research Co., Summit, NJ.
Study of Catalyst Cured Larc-160/Celion 6000 Composites.
Final Report, Jun. 1979 - Aug. 1980.
R. Edelman. Sep 80, 44p NASA-CR-159335
Contract NAS1-15749

LaRC 160 polyimide was modified with a high temperature peroxide catalyst, USP-138, in an attempt to reduce the final cure temperature to below 316 C. This effort was directed at obtaining a material for 177 C use that would cure at similar temperatures to a high performance epoxy while still maintaining the good moisture resistance of a polymide material. Attempts to prepare a laminate made from Celion 6000 fiber and 5% catalyzed LaRC 160 resin gave a material with minimal properties after curing at 193 C. Acceptable properties were not obtained until a final cure temperature of 260 C was used. A control laminate containing no catalyst and cured under the same conditions had only half the level of shear strength. The catalyzed LaRC 160 prepreg was also used to examine the possibility of shortening the conventional LaRC 160 cure at 316 C. Maximum properties were obtained using a 2.5% catalyzed product with a final cure temperature of 316 C held for fifteen minutes. Differences in properties between catalyzed and uncatalyzed product disappeared, however, when the cure time at 316 C was extended to 45 minutes.

N80-31489/1 PC **A06**/MF **A01**
Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
Study of Fiber-Matrix Interface Structure and Interfacial Diffusion Phenomena in Cotac-Type Solidification Composites. Effect on the Thermal Stability of the Fibers.
Ph.D. Thesis - Paris-Sud Univ.
E. Maroni. 1979, 102p ONERA-NT-1979-11, ISSN-0078-3781
Text in French; English Summary. Report Will Also Be Announced as Translation (Esa-TT-661).

The fiber matrix interfacial structure of Cotac type composites was determined by electron microscopy. Interfaces were characterized using the diffusion technique. High resolution autoradiographs showed that diffusion was predominant along the fiber matrix interface. The diffusion coefficients of nickel and niobium were measured for Cotac 74 and Ni, Cr-TaC composites in order to obtain the diffusion data required to predict the high temperature stability of Cotac type composites. The high values of the activation energies for the interfacial diffusion of both nickel and niobium result from the interaction of the diffusing species with carbon. The structural stability of Cotac type composites was investigated at elevated temperatures. It is estimated from the experimental data that no degradation due either to isothermal Ostwald ripening or to thermal gradient coarsening should occur in service at high temperatures.

PB81-108144 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Marine Industry Advisory Services.
Nondestructive Evaluation of Fiber Composites,
John B. Bidwell. 7 Jul 80, 26p MITSG-80-8, OPPORTUNITY BRIEF-21, NOAA-80091504
Index No. 80-708-Int. Report on MIT/Marine Industry Collegium Program.

Because of the growing use of fiber composites in a variety of applications including hull material of small marine craft, there is a need for inexpensive quantitative, nondestructive evaluation techniques for fiberglass, as well as for other composite materials, to provide a basis for ensuring the integrity and serviceability of products made from them. The economic incentives for use of such a technique would be widespread. MIT's Department of Mechanical Engineering had developed a non-destructive, thermal testing technique to detect flaws in fiberglass composites. The technique involves uniform application of heat to one side of a composite structure that has been coated with a cholesteric liquid crystal compound. The temperature rise causes the liquid crystal to change color. Anomalies in the pattern of surface temperature, indicative of various kinds of internal flows, show up as anomalies in the pattern of color change in the liquid crystal coating.

SGAE-3043 PC **A05**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Investigation of Diverse Leaf-Wood and Coniferous Wood Regardin Their Usability for the Production of Wood-Plastic-Combinations.
R. Schaudy, E. Proksch, and E. Slais. Jun 79, 81p CH-250/79
In German.
U.S. Sales Only.

By impregnation with an acrylic monomer mixture and by polymerization with gamma radiation wood-plastic combinations with high dimensional stability have been made from 34 wood species. Data for monomer uptake, density, hardness, impact bending, swelling by volume and weight, and weatherability are presented. Furthermore the attempt of

an aesthetic evaluation of the wood-plastic combinations has been made. The optical impression has been compared with the technological behaviour. As a result several wood species turned out to be especially suitable for the production of wood-plastic combinations of high quality. These woods are ramin, lime, abachi, wainut, bubinga, niangon and mutenye, with some restrictions also spruce, okoume, corola pine and dibetou. (Atomindex citation 11:508885)

11E. Fibers and Textiles

AD-A089 207/5 PC **A02**/MF **A01**
Washington Univ Seattle Dept of Mining Metallurgical and Ceramic Engineering
Stress-Induced Effects upon the Structure and Properties of Carbon Fibers.
Final technical rept. 1 Mar 76-31 May 80,
David B. Fischbach, Kunio Komaki, and Seshadri Srinivasagopalan. 31 Jul 80, 16p ARO-13485.6-MS
Grants DAAG29-76-G-0169, DAAG29-78-G-0142

Microstructures and structural development with heat treatment of carbon fibers from pitch, rayon, polyacrylonitrile and pitch mesophase were characterized by diamagnetic susceptibility and SEM; and the dynamic torsional behavior (modulus, damping at about 1 Hz) and electrical resistance properties (resistivity, temperature dependence, piezoresistance) of individual fibers were measured and compared. A survey of the structure-dependence of the fiber properties revealed similarities that appear to be common to all stratic (hexagonal layer) carbon materials, as well as characteristic differences associated with fiber precursor type and processing. (Author)

11F. Metallurgy and Metallography

AD-A089 208/3 PC **A03**/MF **A01**
California Univ Berkeley Dept of Materials Science and Mineral Engineering
Cluster Variation Study of Ordering in FCC Solid Solutions.
Final rept. 11 Oct 76-29 Feb 80,
J. M. Sanchez, and D. de Fontaine. Jul 80, 45p
UCB-ENG-DDF8001, ARO-14071.7-MS
Grants DAAG29-77-G-0002, DAAG29-78-G-0058

A systematic approach to the calculation of coherent phase diagrams using high-level approximations of the Cluster Variation Method has been developed. The emphasis in this investigation was placed in higher than first neighbor interactions in order to treat the complex ordering observed in the Ni-V and Ni-Mo systems. The new Cluster Variation approximations, when applied to the Ising ferromagnet, yielded significant improvement on the results of previous applications of the theory. A new approach to the Ground State problem including pair and many-body interactions was also developed. (Author)

AD-A089 283/6 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA
Precipitation, Recovery and Recrystallization Under Static and Dynamic Conditions for High Magnesium Aluminum-Magnesium Alloys.
Master's thesis,
Charles Wesley Chesterman, Jr. Mar 80, 73p

Previous studies of the mechanical behavior of warm rolled high magnesium aluminum-magnesium alloys have shown that excellent tensile properties can be developed in these materials. Several questions raised in these previous efforts regarding recrystallization and precipitation of the intermetallic beta phase are addressed in this thesis. It is shown that, for temperatures T less than Ts (where Ts is the solvus temperature) the only microstructural change is the precipitation of the beta phase and no crystallization occurs, even with prior cold work. Further studies of microstructures developed during warm working, with and without prior cold work, also indicate that precipitation and recovery dominate the microstructural changes in warm rolling at temperatures below the solvus for the alloy. Recrystallization will occur readily, but only at temperature in excess of the solvus. Strengthening by warm working, then, occurs by mechanisms similar to cold work strengthening in solid solution alloys. (Author)

AD-A089 296/8 PC **A06**/MF **A01**
Pratt and Whitney Aircraft Group West Palm Beach FL Government Products Div
Evaluation of Crack Growth in Advanced P/M Alloys.
Final rept. 1 Sep 77-30 Jun 79,
David L. Sims, and F. Konrad Haake. Mar 80, 108p PWA-FR-12126, AFML-TR-79-4160
Contract F33615-77-C-5093
See also Rept. no. AFML-TR-76-176-PT-1.

This program evaluates the crack growth characteristics of the advanced P/M alloy AF2-1DA. An interpolative model, developed in an earlier program, is used to describe crack growth properties at various conditions. Results are presented, including applicability of linear elastic mechanics (LEFM) and the effects of frequency, stress ratio, and temperature on crack propagation rates. (Author)

AD-A089 414/7 PC **A05**/MF **A01**
Materials Sciences Corp Blue Bell PA
Elevated Temperature Behavior of Metal-Matrix Composites.
Interim progress rept. 1 Apr 79-31 Mar 80,
Zvi Hashin, and E. A. Humphreys. May 80, 84p
MSC/TPR/1130/1502, AFOSR-TR-80-0936
Contract F49620-79-C-0059

An elasto-plastic, temperature-dependent analysis of a graphite/aluminum composite material system was performed. A hexagonal array model was utilized along with a numerical analysis procedure. Results for the transversely isotropic material included residual processing effects and stresses, and temperature dependent, one-dimensional stress-strain relations, utilizing both isotropic hardening and kinematic hardening assumptions for aluminum matrix.

AD-A089 528/4 PC **A02**/MF **A01**
Michigan Technological Univ Houghton Dept of Metallurgical Engineering
Crack Propagation Along Crystallographic Slip Bands and Hydrogen Embrittlement.
Technical rept.,
J. R. Wilcox, and D. A. Koss. Aug 80, 11p Rept no. TR-14
Contract N00014-76-C-0037

The propagation of a crack along a crystallographic slip band occurs frequently in alloys susceptible to planar, non-uniform slip. Such crystallographic cracking occurs in large grain or single crystal material and on planes inclined to the stress axis and is most commonly observed under cyclic loading conditions in high strength Ni-, Al-, and Ti alloys. In all of these materials, cracks propagating along slip bands usually have a substantially brittle or cleavage-like fracture appearance, which can be sensitive to the environment. This suggests that normal stresses and environmental effects are important in this fracture process.

AD-A089 602/7 PC **A03**/MF **A01**
Cincinnati Univ OH Dept of Materials Science and Metallurgical Engineering
Synthesis of Microstructures and the Relationship between Microstructure and Properties.
Final rept. 15 May 76-31 Aug 79,
Mark E. Rosenblum, and Daniel Eylon. Mar 80, 41p AFWAL-TR-80-4035
Contract F33615-76-C-5227

The interrelationships of microstructure, processing and mechanical properties were investigated in several materials. In titanium alloy systems fatigue behavior, high temperature behavior, properties of powder compacts, and the effects of additions of hydrogen were studied. The aluminum research was concerned primarily with powder products and their unique properties. Other areas of investigation included quantitative metallography and fatigue behavior of AF 1410. (Author)

AECL-6311 PC **A03**/MF **A01**
Atomic Energy of Canada Ltd., Pinawa (Manitoba). Whiteshell Nuclear Research Establishment.
Tensile Properties of Unirradiated Ordered Zr sub 3 Al-Based Alloys.
H. E. Rosinger, and W. G. Hutchings. Sep 79, 38p
U.S. Sales Only.

The tensile propertes of 3 unirradiated Zr sub 3 Al alloys have been investigated in the 77 to 1073 exp 0 K temperature range. In the 298 to 623 exp 0 K range the mode of surface preparation is shown to influence the ultimate tensile strength and plastic elongation but not the yield stress. Specimens with a fine-ground surface exhibit an upper yield stress, a drop in stress to a lower yield stress and then a Luder's strain greater than 7% before workhardening. Specimens wth a milled surface exhibit smooth yielding. The principal effect of surface preparation is to alter the plastic elongation and hence the tensile strength at which failure occurs. Unnotched spcimens fail by grain-boundary fracture at low temperatures, by ductile fracture via microvoid coalescence at intermediate temperatures, and by grain-boundary sliding following dynamic recrystallization at high temperatures. Ductile fracture in the intemediate-temperature region occurs by microcracking, void growth, and void coalescence. (Atomindex citation 11:521405)

CEA-CONF-4700 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Technologie.
Effects of Environment and Hold Times on High Temperature Low Cycle Fatigue Behavior of 316L Stainless Steel.
C. Levaillant, A. Pineau, and B. Rezgui. 1979, 12p CONF-790820-3
In French.International conference on mechanical behaviour of materials, Cambridge, UK, 20 Aug 1979.
U.S. Sales Only.

This study concerns effects of environment and hold times on oligocyclic fatigue properties of a steel Z2 CND 17-13 (316L) at 600 exp 0 C. A triangular strain-time signal (epsilon = 4.10 exp -3 s) was used to determine temperature influence (600 exp 0 C) on steel fatigue resistance; at the same time the effect of a hold time applied at the maximum tensile strain was studied in air and under vacuum. Results of tests realized with this steel show: a decrease in fatigue resistance due to an increase from room temperature to 600 exp 0 C that seems due essentially to an oxidation a larger reduction of fatigue resistance when hold time is longer. This effect is associated to an intergranular decohesion and precipitation of M sub 23 C sub 6 carbides at grain boundaries. A change in the rupture mode from transgranular to intergranular is seen. It is suggested to evaluate intergranular damage by measurement of the ratio of intergranular fracture. (Atomindex citation 11:521356)

CEA-CONF-4725 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Grenoble (France). Dept. de Metallurgie.
Fracture Toughness of a X Alloy under Static Load.
P. Morgand, and H. Churier. 1979, 13p CONF-790802-83
In French.International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.
U.S. Sales Only.

In the High Temperature Reactor research programm of the French CEA, Hastelloy alloy plates contain mineral fibers used as insulating material and as such prevent the concrete core vessel from receiving excess heat. Due to the high pressure exerted on this insulating materials, the Hastelloy plates are heavily stressed and, therefore, it is important to know their fracture strength. In the case of an elastic, brittle material, the fracture toughness is commonly defined through the K/sub 1c/ parameter. But, for plastic materials, measuring K/sub 1c/ requires very large samples and it was found more convenient to measure the fracture parameter J/sub 1c/ instead of K/sub 1c/. Two independent ways were followed to measure J/sub 1c/ : in the first one the shape of the crack after loading was made apparent by some fatigue cycles; after complete fracture of the sample, the amount

of crack extension appears clearly and it becomes possible to generate a J resistance curve. As an alternative, we partially unloaded the specimen to get its compliance: the change in compliance was then supposed to coincide with the start of the crack extension. Finally a finite element code was used to compute the specimen state at the beginning of the crack extension. So we are able to obtain the shape of the Load-Displacement curve and to compare it with the experimental one. (Atomindex citation 11:521371)

CEA-R-4982 PC **A06**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Technologie.
Creep Fatigue Interaction. Hold Time Effects on Low Cycle Fatigue Resistance of 316 L Steel at 600 exp 0 C.
B. Rezgui. Oct 79, 124p
In French.Thesis.
U.S. Sales Only.

This is a study of hold time effects on the low cycle fatigue properties of 316 L austenitic stainless steel at 600 exp 0 C in air. Results obtained for different plastic strain levels indicate that a tension hold time at peak strain lead to a reduction in fatigue life. The importance of this effect depend on the length of hold period, and also on the strain amplitude. No saturation had been observed. Metallographic and microstructural analysis of failed specimens indicates mechanisms by which failure is produced. For continuous cycling the fracture occurs by the initiation and the propagation of a transgranular crack. Creep damage in the bulk of material is formed during periods of tensile stress relaxation; it causes a change in the failure mode which became intergranular. It is the interaction between this creep-damage and fatigue cracks which is partly responsible for the reduction in the fatigue life. Several approaches are used for evaluating creep-fatigue interaction damage and estimating the fatigue life. Among those proposed approaches, the linear damage rule and the strain range partitioning method are discussed. (Atomindex citation 11:521400)

CEA-R-4983 PC **A07**/MF **A01**
CEA Centre d'Etudes de Bruyeres-le-Chatel, Montrouge (France).
Hydrogen Influence on Metal Behavior. Pt. 5. Hydrogen Embrittlement and Stress Corrosion Cracking of 0.2 Wt % Vanadium Uranium Alloy.
R. Arnould-Laurent, and J. P. Fidelle. Aug 79, 137p
In French.Thesis.
U.S. Sales Only.

Internal hydrogen embrittlement (IHE) has been investigated by means of an improved sensitivity mechanical test involving multiaxial stresses. Embedded disks clamped at their edge are submitted to an increasing gaseous pressure on one side. Modelling with the finite elements method has demonstrated that the disk pole is plane stressed and the anchorage plane strained. It is shown that thermally H-charged, alpha -structured, U-0.2V alloy has an IHE threshold lower than 0,02 ppm. A systematic study of the stressing rate influence shows that this alloy is affected by two main kinds of IHE, one due to hydrides at high rates and, one due to dissolved H at low rates. Finally Stress Corrosion Cracking has been studied in aqueous media as a function of pH and the role of HE is indicated. H can form by a chemical reaction with the metal and enter the metal. In pH zones without cracking, H either is not formed or cannot enter the metal. Similar conclusions are proposed for U 0.2 wt % Cr alloy. (Atomindex citation 11:521252)

CEA-R-4989 PC **A11**/MF **A01**
CEA Centre d'Etudes de Bruyeres-le-Chatel, Montrouge (France).
Gaseous Oxygen and Hydrogen Embrittlements of the Uranium-10 Wt % Molybdenum Alloy.
J. Corcos. Jul 79, 244p
In French.Thesis.
U.S. Sales Only.

The stress corrosion of an U-10 wt % Mo alloy in high purity gaseous oxygen and hydrogen was studied. Tests were performed with fracture-mechanic specimens, fatigue precracked and carried out in tension with a constant sustained load. The experimental procedure enabled to determine the S.C. morphology during the test, and its kinetics. Tests in gaseous oxygen were performed with p02=0.15 MPa from 0 exp 0 C to 100 exp 0 C, and at 20 exp 0 C for p02=0.15, 0.15.10 exp -2 and 0.15.10 exp -4 MPa. Two kinetic laws are proposed. Cracking is transgranular with a quasi-clivage type, and occurs on the (1 1 1) planes of the matrix. Tests in gaseous hydrogen were performed with pH2=0.15 MPa from -50 exp 0 C to + 135 exp 0 C; for all the tests, even those under no exterior load, there is a failure by S.C. and macroscopic hydruration occurs. We propose a kinetic law, which may display that the hydruration phenomenon rules the S.C. propagation. We have performed the identification of the hydride, as well as the study of the precipitation. These phenomena don't occur with pH2=0.15.10 exp -2 MPa. The embrittlement is thought to be due to a formation-failure cycle of an hydride precipitate at the crack tip. (Atomindex citation 11:521286)

INIS-mf-5684 PC **A07**/MF **A01**
Amsterdam Univ. (Netherlands).
Investigations on Ce- and Yb-Based Intermetallic Compounds.
R. A. Elenbaas. 20 Feb 80, 135p
Proefschrift (Dr.).
U.S. Sales Only.

The author describes investigations on a number of cerium- and ytterbium-based intermetallic compounds and alloys, yielding a lot of experimental results which could not always be put in a quantitative picture. All experimental data are consistent with a single-ion behaviour, where the 4f state is more or less modified by the conduction electrons. In the investigated systems several different features of the magnetism of cerium atoms in metals were studied. (Atomindex citation 11:524859)

INKA-Conf-79-225-001
PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Material- und Festkoerperforschung.
Creep, Rupture at Non Stationary Stress and Temperature Loading Conditions.
M. Bocek. 1979, 7p CONF-790801-12
International conference on the strength of metals and alloys, Aachen, F.R. Germany, Aug 1979.
U.S. Sales Only.

Assuming the validity of the life fraction rule (LFR) the time to rupture as well as the respective stress and temperature at failure have been calculated for several ramp loading conditons. These calculations allow also to predict the life time of structures subjected to superimposed stress-temperature ramps as well as to tensional load and temperature cycles. The calculations are compared to experimental results. (Atomindex citation 11:518007)

INKA-Conf-79-260-001
PC **A04**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Festkoerperforschung.
Light Element Implantations in Metals.
D. Kaletta. 1979, 56p CONF-790785-1
In German.Materials seminar, Karlsruhe, F.R. Germany, 6 Jul 1979.
U.S. Sales Only.

The paper reviews the radiation damage phenomena in metals after light element irradiation, in particular helium. The irradiation-induced defects, the associated microstructural damages and the changes in mechanical properties induced are discussed in terms of the homologous temperature and the CTR-parameter combining the amount of atoms injected and the amount of damage created. Particular attention is paid to the atomistic approach to describing small-size effects. Large-size effects, currently created in a phenomenological manner, are discussed in the last section and the phenomena of gas re-emission, gas bubbles in the bulk and surface bubbles are considered in some detail. (Atomindex citation 11:511783)

N80-31527/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Adherence of Ion Beam Sputter Deposited Metal Films on H-13 Steel.
M. J. Mirtich. 1980, 17p NASA-TM-81585, E-562
Presented at the 27TH Natl. Am. Vacuum Soc. Symp., Detroit, 14-17 Oct. 1980.

An electron bombardment argon ion source was used to sputter deposit 17 different metal and metal oxide films ranging in thickness from 1 to 8 micrometers on H-13 steel substrates. The film adherence to the substrate surface was measured using a tensile test apparatus. Comparisons in bond strength were made between ion beam, ion plating, and RF deposited films. A protective coating to prevent heat checking in H-13 steel dies used for aluminum die casting was studied. The results of exposing the coated substrates to temperatures up to 700 degrees are presented.

N80-31546/8 PC **A05**/MF **A01**
Centro Informazioni Studi Esperienze, Milan (Italy). Servizio Documentazione.
The Role of Electron Microscopy by Transmission in the Study of Radiation Damage in Metals Il Ruolo Della Microscopia Elettronica Per Trasmissione Nello Studio Dei Danni DA Radiazione Nei Metalli.
G. Chevallard, and D. Wenger. Dec 79, 87p
CISE-1541

The applications of transmission electron microscopy to the study of radiation damage in metals are discussed. The principles of this technique are reviewed and the method compared with other methods. The interpretation of the micrography contrast effects due to metal defects and the interpretation rules used to identify these defects are examined. The defect population analysis, necessary for the characterization of the microstructure before and after the irradiation, is discussed.

N80-31547/6 PC **A04**/MF **A01**
Centro Informazioni Studi Esperienze, Milan (Italy). Servizio Documentazione.
Electronic Properties of Materials and Corrosion Phenomena. A Nonconventional Approach to the Mechanism of Stress Corrosion Cracking Proprieta Elettroniche Dei Materiali E Fenomeni di Corrosione. Un Approccio Non Convenzionale Ai Meccanismi di Stress Corrosion Cracking.
M. Martinelli, and C. Ronchetti. Nov 78, 59p
CISE-N-188
Text in Italian; English Summary.

The perturbations induced on metal free electrons by the mechanical stress state are analyzed, as well as the consequences of such perturbations on the metal-solution interface and then on the electrochemical parameters. It is found that the metal strain state, both from an elastic and a plastic standpoint, has remarkable effects on the metal fermi energy and work function and that such effects influence the redox potential of an electrode made up with the same material. A working hypothesis is formulated, where the modification of the metal electronic state is the main cause for the onset of material areas with a different electrochemical behavior.

N80-31548/4 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
Comparison of Fracture Toughness in Titanium Alloys IMI 550 and IMI 551.
R. J. H. Wanhill. 14 May 80, 21p NLR-TR-78143-U
Contract NIVR-1696

Fracture toughness tests on two high strength titanium alloys, IMI 550 and 551, showed that the higher strength alloy, IMI 551, had a much lower toughness. The alloys were very similar in microstructure and fracture mechanisms. A number of model formulations for predicting fracture toughness were compared with the experimental results. This comparison indicated a number of parameters to be important, namely yield stress, elastic modulus, plane strain fracture strain, strain hardening exponent, and microvoid (dimple) diameter. The observed increase in fracture strain, dimple diameter, and fracture toughness with decreasing strength can be rationalized by voids occuring earlier during deformation and by voids initiating at many sites inactive in the lower strength material.

N80-31847/0 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.

Flight Simulation Fatigue Crack Propagation in 7010 and 7075 Aluminum Alloy Plate.
R. J. H. Wanhill, W. G. J. Thart, and L. Schra.
May 79, 20p NLR-MP-79019-U

The fatigue crack propagation resistances of 7010-T7651, 7010-T73651 and 7075-T7351 thick plate were compared for flight simulation (gust spectrum) loading conditions. The 7075-T7351 was slightly superior, and it was shown that this superiority was not essentially due to the higher fracture thoughness of this alloy. The influence of specimen thickness on the crack propagation resistance was significant. Thinner specimens gave longer crack propagation lives, generally lower crack propagation rates, and generally longer delays in crack growth following severe flights.

N80-31848/8 PC **A02**/MF**A01**E
National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
Environmental Fatigue.
R. J. H. Wanhill. Jun 79, 25p NLR-MP-79025-U
Presented at Soc. Of Met. Engr. Sem. On Metal Fatigue, Leuven, Belgique, Oct. 1979.

An overview of the environmental influences on fatigue crack initiation and propagation is given followed by a discussion of practical measures to alleviate and control the environmental contribution. These include design changes facilitating inspection and reducing fatigue and corrosion, surface protection, cathodic protection materials changes, the use of inhibitors, water displacing compounds, sealants, and barrier layers.

PATENT-4 214 904 Not available NTIS
Department of the Air Force Washington DC
Gold-Tin-Silicon Alloy for Brazing Silicon to Metal.
Patent,
Donald R. Kitchen, and Loren A. Jacobson. Filed 12 Dec 78, patented 29 Jul 80, 4p AD-D007 443/5, PAT-APPL-968 873
Supersedes PAT-APPL-968 873-78, AD-D006 223.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An alloy for brazing a silicon die to a gold-plate kovar header consists essentially of 19 to 21 weight percent tin and 0.6 to 0.8 weight percent silicon with the balance being gold. The alloy melts at a temperature below 200 C. which is substantially lower than that of the conventional gold-silicon eutectic alloy. (Author)

PATENT-4 215 181 Not available NTIS
Department of the Air Force Washington DC
Fretting Fatique Inhibiting Method for Titanium.
Patent,
Robert K. Betts. Filed 11 May 78, patented 29 Jul 80, 7p AD-D007 445/0, PAT-APPL-904 847
Supersedes PAT-APPL-904 847-78, AD-D005 085.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method for inhibiting the effects of fretting fatique in a pair of opposed titanium alloy mated surfaces through the use of a copper shim insert positioned between and in contact with the mated surfaces. (Author)

PB81-104622 PC **A02**/MF **A01**
Bureau of Mines, Salt Lake City, UT. Salt Lake City Metallurgy Research Center.
Extracting Lithium from Clays by Roast-Leach Treatment.
Rept. of investigations 1980,
J. T. May, D. S. Witkowsky, and D. C. Seidel.
1980, 22p BUMINES-RI-8432

The Federal Bureau of Mines investigated the extraction of lithium from hectorite-type clay deposits found on the Nevada-Oregon border. Two clay samples were used in the investigation; one contained 0.36 pct Li and the second contained 0.64 pct Li. The purpose of this laboratory-scale research was to determine how these clays responded to different extraction techniques. Extraction techniques investigated were sulfuric acid leach, sulfuric acid bake-water leach, and roast-water leach procedures with chlorides, sulfates, carbonates, and combinations of these reagents. The processing characteristics of the clay samples showed significant variations, and no one technique was effective for both materials. Lithium extractions near 90 pct were achieved during these exploratory studies.

PB81-106676 PC **A04**/MF **A01**
Halomet, Inc., Manlius, NY.
Metals Recovery from Post Combustion Coal Ash.
Rept. for Nov 78-79,
R. G. Aldrich. Nov 79, 61p NYSERDA-79-11

This report detailed the results of an investigation into the applicability of fluorine-based separation for the commercial recovery of metal values from fly ash produced in electric utility boilers fired by coal. The study dealt principally with the extraction of aluminum.

SKBF/KBS-TR-79-14 PC **A03**/MF **A01**
Kaernbraenslesaekerhet, Stockholm (Sweden).
Corrosion Testing of Unalloyed Titanium in Simulated Disposal Environments for Reprocessed Nuclear Waste.
S. Henrikson, and M. de Pourbaix. May 79, 34p STUDSVIK/E1-79/83
In Swedish.
U.S. Sales Only.

On the commission of the Nuclear Safety Project (KBS) corrosion tests have been carried out on unalloyed titanium, which is planned to be used as an outer corrosion resistant canister for reprocessed nuclear waste. Tests were conducted for 300 days in a corrosive medium of modified Baltic water at 100 and 130 degC with high (8 ppm) or a low (< 10 ppb) oxygen content. The tests at low oxygen content and 100 degC were continued for 600 days. Very low oxidation rates (0.01 - 0.1 mu m/year) were obtained, corresponding to a life time of ten to hundred thousands of years for a 6 mm thick titanium canister. In spite of the considerably more severe corrosive contitions (higher temperature, higher chloride and fluoride contents as well as lower pH) compared with those estimated for the final disposal, no signs of localized corrosion were found, nor could any hydrogen pick-up be detected. (Atomindex citation 11:511477)

11H. Oils, Lubricants, and Hydraulic Fluids

PATENT-4 215 072
Not available NTIS
Department of the Air Force Washington DC
Diphospha-S-Triazines.
Patent,
Kazimiera J. L. Paciorek, Reinhold H. Kratzer, Jacquelyn Kaufman, Thomas I. Ito, and James H. Nakahara. Filed 7 Feb 79, patented 29 Jul 80, 3p AD-D007 444/3, PAT-APPL-6-010 092
Supersedes PAT-APPL-6-010 092, AD-D005 931.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Diphospha-s-triazines wherein the two phosphorus atoms are substituted by aromatic groups and the carbon atom is substituted by either a perfluoroalkyl or a perfluoroalkylether moiety. The triazines exhibit a broad range of properties and are useful as antioxidant-anticorrosion agents, lubricants, and hydraulic fluids. (Author)

PB81-108003 PC **A10**/MF **A01**
Pacific Environmental Services, Inc., Santa Monica, CA.
Volatilized Lubricant Emissions from Steel Rolling Operations.
Final rept. Apr 78-Apr 79,
C. J. Mackus, and K. N. Joshi. May 80, 217p EPA-600/2-80-105
Contract EPA-68-02-2606

The report gives results of a study of the volatilization of lubricants used in steel rolling. Data from nine steel mills were used to: define the volatilized portion of lubricants used in rolling; and prepare total oil, grease, and hydraulic material balances for actual and typical cold and hot rolling operations. Air Pollution from cold and hot rolling was estimated from data acquired from questionnaires, plant visits, and emission source sampling. Introductory and background information on steel rolling, lubrication practices, rolling mill lubricants, and rolling emulsion application techniques is also presented. Study results generally agree with those of a previous study which estimated that for a typical integrated steel plant, with a raw steel production capacity of 3.6 million metric tons per year, 6530 metric tons per year of oils, greases. and hydraulic fluids are used throughout the plant. Since about 83% of these lubricants are used in steel rolling and finishing, this study concentrated on these operations. For a typical cold strip mill, total hydrocarbon (HC) emissions were estimated to be 358 metric tons per year. Therefore, the total HC emission rate for all cold strip mills in the U.S. is an estimated 7160 metric tons per year. It was also estimated that for a typical hot strip mill, total HC emissions were 94.7 metric tons per year (2460 metric tons per year for all US hot strip mills).

PB81-800039 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
High Temperature Lubricants. 1974-July, 1980 (Citations from the American Petroleum Institute Data Base).
Rept. for 1974-Jul 80,
Diane M. Cavagnaro. Oct 80, 164p
Supersedes NTIS/PS-79/1033, and NTIS/PS-78/0949.

The bibliography contains citations on high temperature lubricants from worldwide research. The citations cover the composition, properties, testing, uses, performance, and wear ability of hydraulic fluids, oils, greases, and solid lubricants. (This updated bibliography contains 159 citations, 17 of which are new entries to the previous edition.)

11I. Plastics

AD-A089 164/8 PC **A03**/MF **A01**
National Bureau of Standards Washington DC Chemical and Biodegradation Processes Group
Characterization of Bioactive Organotin Polymers: Fractionation and Determination of MW by SEC-GFAA.
Interim technical rept.,
E. J. Parks, and F. E. Brinckman. 28 Jul 80, 38p
Presented at the International Symposium on Controlled Release of Bioactive Materials, 27-30 Jul 80, Ft. Lauderdale, FL.

Organotin Polymers (OMP's) prepared by the free radical copolymerization of methyl methacrylate (MMA) with tributyltin methacrylate (TBTM) and/or tri propyltin methacrylate (TPTM) were subjected to size exclusion chromatography (SEC) in tetrahydrofuran as solvent and mobile phase, with continuous eluant monitoring by ultraviolet (UV) and tin-specific graphite furnace (GFAA) spectrophotometry. SEC columns packed with mu-Styragel (microspheres of polystyrene cross linked with divinyl benzene) separated the copolymers into two major fractions. GFAA provided histograms proportional to tin concentration, from which weight average- and number average- (M sub w and M sub n) molecular weights of the copolymer fractions were estimated, based on the measured peak intensities of individual GFAA signals and the elution volumes of polystyrene standard samples of known M sub w. Among 19 OMP formulations, fractions of M sub w 20,000 to 50,000 and 200 to 400 were observed, with molecular weight distributions (M sub w/M sub n) of 2.0 to 5.0 and 1.1 to 2.1, respectively. Approximately 80 to 90 percent of the observed tin signal is associated with the high MW fraction, and 10 to 20 percent with the low MW fraction. A larger excess of MMA in the initial reaction mixture is associated with appearance of an early, intense peak

in the UV chromatogram, without a correlated tin signal. This indicates the probable formation from excess MMA of poly-methylmethacrylate.

AD-A089 222/4 PC **A05**/MF **A01**
Johns-Manville Sales Corp Denver CO Research and Development Center
Performance Evaluation of Vinyl Replacement Windows.
Final rept. 1 Sep 79-15 Jul 80,
Philip B. Shepherd. 15 Jul 80, 85p USAFESA-TS-2080
Contract DAAK70-78-D-0002

Replacement windows with structural elements composed of polyvinyl chloride compound have been examined to determine their performance and energy conserving potential. Life cycle costing procedures and a mathematical model have been presented for use in comparing different windows. These methods should be carefully followed as it was not possible to generalize on the suitability of any specific type of window. The major factors which influence window selection include installed cost, air infiltration and maintenance. It was surprising to find that a window's thermal transmittance coefficient, 'U' value, had only a small impact on the economic evaluation. (Author)

AD-A089 260/4 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Brillouin Scattering of Solithane 113 at High Pressure,
M. Abebe, and P. E. Schoen. 11 Sep 80, 12p

Brillouin spectra from Solithane 113 have been obtained as a function of pressure at 26 C using a Fabry-Perot Interferometer. The modulus was derived from the sound velocity and was found to double as the pressure increased to 2.67 K bar. In addition the modulus was measured as a function of scattering angle in the range 64 to 161.45 deg. For both the pressure and the angle-dependent data it was found that the moduli were greater at gigahertz frequencies than at one megahertz, indicating frequency dispersion. (Author)

AD-A089 261/2 Not available NTIS
Naval Research Lab Washington DC
Application of Advanced Light Scattering Techniques to the Study of Polymer Properties,
J. M. Schnur, P. Schoen, and S. L. Wunder. Jun 78, 13p
Availability: Pub. in Proceedings of International Conference on the Fundamentals of Tribiology, held at Massachusetts Inst. of Tech Cambridge, MA. p39-52 Jun 78 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A089 312/3 PC **A04**/MF **A01**
Naval Research Lab Washington DC
The NRL Program on Electroactive Polymers.
Annual progress rept. no. 2,
Robert B. Fox. 15 Sep 80, 59p Rept no. NRL-MR-4335

The electroactive polymer program of the Naval Research Laboratory (NRL) is directed towards the development of synthetic, non-metallic polymers with properties superior to those of the currently available electrical and electronic materials, whose utility is often limited by such factors as weight, mechanical fragility, fabrication problems, corrosion, scarcity and high cost. These limiting properties of current electronic materials closely match the superior properties of non-metallic polymeric materials, i.e., (1) high strength to weight ratio; (2) unlimited availability; (3) low cost; (4) simplified fabrication; and (5) variability in molecular design and properties. The thrust of this program is therefore to determine those chemical combinations of molecules that have high electrical conductivity and then by chemical synthesis or modification incorporate them into polymers that combine the required electrical and electromagnetic properties with the desired material characteristics. This summary report contains thirteen contributions in four interrelated areas: theory, synthesis, characterization, and application. (Author)

AD-A089 417/0 PC **A02**/MF **A01**
Naval Air Development Center Warminster PA Aircraft and Crew Systems Technology Directorate
Studies on PGBX: Fractionation by a Combination of Dialysis and Molecular Exclusion Chromatography.
Phase rept.,
H. W. Shmukler, S. F. Kwong, E. Soffer, M. G. Zawryt, and W. Feely. 22 Aug 80, 22p Rept no. NADC-80156-60

By combining the techniques of dialysis and molecular exclusion chromatography (MEC), a Type III prostaglandin PGBX preparation could be separated into fractions containing different polymer composition and different amounts of in vitro PGBX activity. An over-all purification of PGBX activity was obtained in fraction 3 that contained 20% of the total weight and 40% of the total PGBX activity with a 2 fold purification of specific activity of the PGBX inhibitor factor. This fraction, which was retained by the membrane on aqueous dialysis, and not retained by the membrane on methanol dialysis, had a long retention time on MEC, and gave molecular weight (vapor pressure osmometry) of 1789. Furthermore this fraction was homogeneous by analytical MEC. (Author)

AD-A089 467/5 PC **A02**/MF **A01**
Arizona Univ Tucson Dept of Chemistry
Polyaromatic Ether-Ketone-Sulfones Containing 1,3-Butadiene Units,
V. Sankaran, and C. S. Marvel. 21 Nov 78, 10p
AFOSR-TR-80-0823
Grant AFOSR-77-3112
Pub. in Jnl. of Polymer Science, v17 p3949-3957 1979.

No abstract available.

AD-A089 606/8 PC **A05**/MF **A01**
Battelle Columbus Labs OH
Polymer Research in Rapid Runway Repair Materials.
Final rept. Jan-Oct 79,
Manfred Luttinger, Charles W. Kistler, Jr., Henry M. Grotta, and Richard G. Sinclair. Nov 79, 93p
AFESC/ESL-TR-79-43
Contract F08635-79-C-0040

Low viscosity, two-component epoxy resins were formulated for airless spray application over quartz or dolomite aggregates. The formulation selected for full evaluation was based on mercaptan curing systems. Trifunctional acrylate monomers were used in some formulations as modifiers. The resulting polymer concrete set up within 3 to 4 minutes after mixing at temperatures around 73 degrees F. Good cures within 1/2 hour of mixing can be obtained in wet environments down to 5 degrees C and in dry environments down to -25 degrees C. Good adhesion to wet aggregates requires the use of coupling agents, organofunctional silanes being preferred. Good bonding to asphalt and Portland cement concrete and good wear characteristics were demonstrated. Flexural strength properties are satisfactory after cool down both under dry and wet application conditions. While the polymer concrete is hot due to the exotherm of the curing reaction, flexural strength properties are low. (Author)

N80-31521/1 PC **A03**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France). Div. Systemes Balistiques et Spatiaux.
Application of Physiochemical Analysis Methods to Forming Stratified Materials with High Temperature Energy Matrices Methodes d'Analyses Physico-Chimiques Appliquees au Moulage des Stratifies a Matrice Apoxy Haute Temperature.
P. Hebrard. 1980, 28p SNIAS-801-422-105
Text in French. Presented at Conf. On Journees d'Etudes Intern. Du Verre Textile et des Plastiques Renforces, Paris, 16-17 Apr. 1980.

The techniques permit a nonporous, completely or sufficiently polymerized homogeneous material with an optimum fiber/matrix ratio to be obtained which is free from volatile matter. Methods employed include: thermogrammetry, differential microcalorimetry, and dynamic viscoelastic analysis. Tables of results relating to specific materials are given together with a series of graphs representing the various corresponding thermal and mechanical characteristics. The use of such methods leads to a high degree of reliability in the fabriction process and to the production of materials of guaranteed quality.

11J. Rubbers

AD-A089 682/9 PC **A04**/MF **A01**
Mechanical Technology Inc Latham NY Research and Development Div
Development of Low-Friction Elastomers for Stern-Tube Bearings.
Final rept. 1 Oct 79-31 Jul 80,
Bharat Bhushan. 31 Jul 80, 63p Rept no. MTI-80TR44
Contract N00014-79-C-0041

The objective of the program was to develop lubricant-filled nitrile rubber to obtain low friction and possibly low wear for seawater-lubricated sliding applications. Limited work has been done in industry on adding solid and/or liquid lubricants to the elastomers during compounding. Not much data have been published due to the proprietary nature of the work; but, based on what has been published and discussions with experts in the lubrication field, it is believed that no systematic study had previously been undertaken. This is probably the first systematic study to discover what has been done in the field and to further develop lubricant-filled elastomers. The base elastomer selected was butadiene acrylonitrile copolymer (per MIL-B-17901, Class I). Two lubricant approaches were taken. First, an incompatible and lubricating oil was added in the elastomer during compounding. As a result of aging, these oils migrate to the surface and continuously provide a lubricant film. In another approach, the solid lubricant particles were added during compounding. As the elastomer wears, it will expose newer solid-lubricant particles. The following solid lubricants were selected: MoS2, graphite, cadmium oxide-graphite-silver, and other proprietary additives. The fillers ranged in quantity from 5% to 20% by weight. The compositions were made by three experienced molders based on MTI's recommendations.

PB81-106569
(Order as PB81-106536, PC **A05**/MF **A01**)
National Bureau of Standards, Washington, DC. National Measurement Lab.
Representation of Long-Time Creep in a Pure-Gum Rubber Vulcanizate,
Lawrence A. Wood. 30 Jan 80, 12p
Included in Jnl. of Research of the National Bureau of Standards, v85 n4 p283-293 Jul-Aug 80.

Creep may be expressed as delta E/E(1) = A log t + B(t-1) where delta E is the increase of elongation above E(1) the one-minute value, during the time t. The initial slope of a plot of delta E/E(1) against log t is A, a measure of physical creep. The limit of the final slope of a plot of delta E/E(1) against (t-1) is B, a measure of chemical creep. The validity of the equation is determined by the linearity of a plot of (delta E/E(1) - A log t) against (t-1) after A has been determined by the first plot. B is obtained as the slope. With an activation energy of 84-125kJ(mol) (20-30 kcal(mol)) it probably reflects oxidative degradation of the network, often initiated by ozone. The appearance time at which the creep is first observed to exceed A log t can be taken as equal to 1/B. At high temperatures B is drastically increased with a corresponding strong reduction in appearance time. Creep in excess of that given by the equation is sometimes observed during a period immediately before rupture.

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

AD-A089 155/6 PC **A02**/MF **A01**
Princeton Univ NJ Dept of Statistics
Directional Data Analysis.
Technical rept.,
Geoffrey S. Watson. Jul 80, 24p Rept no. TR-170-SER-2
Contract N00014-79-C-0322

This article, written for the Encyclopaedia of Statistical Sciences, gives a brief introduction with many references to directional data analysis. (Author)

AD-A089 177/0 PC **A02**/MF **A01**
Carnegie-Mellon Univ Pittsburgh PA Dept of Computer Science
Computational Complexity,
Joseph F. Traub. Jul 80, 13p
Contract N00014-76-C-0370, Grant NSF-MCS78-23676
Prepared in cooperation with Columbia Univ., New York, NY. Dept. of Computer Science.

According to the story, which had been picked up from the magazine Science, 'apart from its profound theoretical interest, the discovery may be applicable in weather prediction, complicated industrial processes, petroleum refining, the scheduling of workers at large factories, secret codes and many other things. The new York Times coverage generated substantial controversy concerning the merits of the discovery, a new algorithm for doing linear programming. Near the end of this article we will evaluate this algorithm. The new York Times story concerned the 'computational complexity' of the linear programming problem. Although computational complexity does not always make front page news, it is a very active and important research area. Its subject is the determination of the intrinsic difficulty of mathematically posed problems arising in many disciplines. The study of complexity has led to more efficient algorithms than those previously known or suspected. We illustrate some of the important ideas of computational complexity with the example of matrix multiplication. (Author)

AD-A089 183/8 PC **A03**/MF **A01**
Virginia Polytechnic Inst and State Univ Blacksburg
Markovian Time-Delay Sampling Policies.
Research rept.,
Y. V. Hui, and D. R. Jensen. Aug 80, 29p RR-Q-5, ARO-15194.6-M
Grant DAAG29-78-G-0172

Sampling procedures are considered for monitoring the output of a production process. Sampling rates are allowed to depend on one of several levels of acceptance or rejection, sampling less frequently when the process is in control. The problem is formulated as a simple Markov process whose properties yield the expected values and the variances of the number of samples and the numbers of various types of adjustments to the process. Computations are given in support of the economic design of variable sampling policies of this type. (Author)

AD-A089 194/5 PC **A03**/MF **A01**
Carnegie-Mellon Univ Pittsburgh PA Dept of Statistics
Analyzing Data from Multivariate Directed Graphs: An Application to Social Networks.
Technical paper,
Stephen E. Fienberg, Michael M. Meyer, and Stanley S. Wasserman. Jul 80, 32p Rept no. TR-185
Contract N00014-80-C-0637
Prepared in cooperation with Minnesota Univ., St. Paul. Dept. of Applied Statistics. Contract N00014-78-C-0151, NSF-SOC78-26075, NSF-SES80-08573.

A multivariate directed graph consists of a set of g nodes, and a family of directed arcs (one for each relation) connecting pairs of nodes. Such multivariate directed graphs provide natural representations for social networks. In this paper, methods to analyse a network of 73 organizations in a Midwest American community linked by three types of relations is considered: information, money, and support. The resulting data set, described by Galaskiewicz and Marsden (1978), involves 3 x 73 x 72 = 15,768 possible arcs or 'observations'. The report describes a class of stochastic loglinear models for multivariate directed graphs, demonstrate how they can be fit to the data using generalized iterative scaling of Darroch and Ratcliff (1972), and explain the connection between these models and variants on standard loglinear models for multidimensional contingency tables discussed by Bishop, Fienberg, and Holland (1975). It also considers a disaggregation of the organizations into sub-groups, and demonstrate how to adapt the models to explore the intra- and inter-group relationships. These methods generalize research of Holland and Leinhardt (1980), who develop a model for dyadic relationships in univariate directed graph data. The paper includes a detailed analysis of the Galaskiewicz-Marsden data.

AD-A089 220/8 PC **A05**/MF **A01**
Stanford Univ CA Dept of Statistics
An Adaptive Choice of the Scale Parameter for M-Estimators.
Technical rept.,
Robert Michael Bell. Jul 80, 83p TR-3, ARO-16668.1-M
Contract DAAG29-79-C-0166

Let x sub 1 to x sub n be a random sample from a distribution symmetric about the unknown location parameter theta. A major class of robust estimators of location is the class of M-estimators, each of which corresponds to a function psi defined on the reals. To be scale equivariant, these estimators require the use of a scale equivariant function of the sample. Commonly, this scale parameter is chosen to be a constant times the sample MAD (medial absolute deviation from the median). For a given function psi, the variance of the corresponding M-estimator vaires considerably with the value of the scale parameter. It is therefore proposed that the value which minimizes an estimate of the asymptotic variance of the M-estimator be used as the scaling factor. This adaptive method of scaling is shown to be asymptotically optimal (under fairly general conditions), in the sense that the resulting M-estimator has the smallest possible asymptotic variance among all M-estimators based on psi. In particular, when the underlying distribution is normal, the adaptive estimator based on any reasonable psi achieves full asymptotic efficiency, i.e., is asymptotically equivalent to the sample mean. The performance of the estimator for small samples is investigated by Monte Carlo methods for several choices of psi using the triefficiency criteria. A slight modification of the above estimator compares favorably with Tukey's bisquare M-estimator for sample sizes as small as 20. (Author)

AD-A089 227/3 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Information and Decision Systems
Towards a Theory of Sequence Discrimination by Finite-Dimensional Discrete-Time Systems: Linear Acceptors,
Martin E. Kaliski, and Karen Lemone. 1980, 5p
LIDS-P-1002, AFOSR-TR-80-0658
Contract F49620-80-C-0002
Pub. in Proceedings of Asilomar Conference on Circuits, Systems and Computers (13th) p288-290, 5-7 Nov 79.

No abstract available.

AD-A089 237/2 PC **A02**/MF **A01**
Georgia Inst of Tech Atlanta School of Industrial and Systems Engineering
Augmented Robust Estimators.
Technical rept. 1 Apr 79-1 Sep 80,
Ronald G. Askin, and Douglas R. Montgomery. Dec 78, 11p
Contract N00014-78-C-0312
Pub. in Technometrics, v22 n3 p333-341 Aug 80.

No abstract available.

AD-A089 243/0 MF **A01**
Texas A and M Univ College Station Inst of Statistics
Unbiased L1 Estimators and Their Covariances.
Technical rept.,
D. Book, J. Booker, H. O. Hartley, and R. L. Sielken, Jr. Jun 80, 71p
Contract N00014-78-C-0426
Availability: Microfiche copies only.

The parameters in a linear regression model can be estimated by minimizing the sum of the absolute residuals (L1 estimation) instead of the more classical approach of minimizing the sum of squared residuals (least squares estimation). In addition to other noise properties L1 estimators are less sensitive to outliers than least squares estimators. This paper describes a linear programming algorithm and computer program for obtaining unbiased L1 estimators and estimates of their covariances. These estimated covariances are the new feature in this work and are an extremely important ingredient in hypothesis tests and confidence interval construction. Technical Report 65 provides an analogous treatment of L1 estimation subject to linear constraints on the parameters. (Author)

AD-A089 314/9 PC **A07**/MF **A01**
Army Materiel Systems Analysis Activity Aberdeen Proving Ground MD
Proceedings of the Meeting of the Special Interest Group on Control Theory (1st) Held at Aberdeen Proving Ground, Maryland on 22 May 80,
Herbert E. Cohen. May 80, 131p

Partial contents: Research for US Army Advanced G&C System; Sub-Optimal State Estimation as Related to Predictive Fire Control System Design; Detection and Initiation of Firing Command for an Acceleration Predictor Fire Control System Engaging Maneuvering Targets; Hybrid Computer Simulation of Combat Tank Driven Reticle Fire Control; Robust Autoregressive Models for Predicting Aircraft Motion from Noisy Data; A Design Methodology for Estimators and Predictors in Fire Control Systems; An Adaptive Lead Prediction Algorithm for Maneuvering Target Engagement; and Application of Delay Feedback in Control System Design.

AD-A089 350/3 PC **A11**/MF **A01**
Stanford Univ CA Stanford Electronics Labs
Computational Issues in Linear Least-Squares Estimation and Control.
Technical rept.,
John A. Newkirk. 6 Jun 79, 250p Rept nos. SU-SEL-79-019, SU-SEL-TR-M355-7
Contract MDA903-78-C-0179, ARPA Order-3506
Sponsored in part by Grant NSF-ENG78-10003.

The dissertation focuses on the steady-state solution to the linear estimation and control problems. Following a pertinent review of linear algebra and computation fundamentals, various approaches to solving the matrix Riccati equation are examined. After reviewing eigenvector decomposition and various iterative algorithms, square root doubling algorithms are motivated. Scattering theory is used to initiate an algebraic derivation of these algorithms, and is then extended to provide a pure derivation of several square root algorithms. A set of criteria for choosing among these algorithms is presented and examined with empirical evaluations. Differentiating criteria include sensitivity to repeated closed-loop eigenvalues, the impact of singular model parameters, computational accuracy, and rate of convergence. Sensitivity to parameter uncertainty in discrete-time systems is considered using a quadratic minimization of a generalized cost function. This same algorithm is used to design arbitrary-order compensation using complete system information. Algorithm implementation is then considered in terms of both present and future hardware. (Author)

AD-A089 355/2 PC **A04**/MF **A01**
New York Univ NY Courant Inst of Mathematical Sciences

Decay of Solutions of the Wave Equation Outside Nontrapping Obstacles.
Technical rept.,
Cathleen S. Morawetz, James V. Ralston, and Walter A. Strauss. Dec 76, 63p
Contract N00014-76-C-0439, Grant NSF-MCS76-10227
Pub. in Communications on Pure and Applied Mathematics, v30 p447-508 1977.

No abstract available.

AD-A089 411/3 PC **A02**/MF **A01**
Minnesota Univ St Paul Dept of Applied Statistics
Alternative Computational Methods for Estimation in Multinomial Logit Response Models. Revision.
Technical rept.,
Stephen E. Fienberg, Michael M. Meyer, and G. W. Stewart. Nov 79, 13p Rept no. TR-348-REV
Contract N00014-78-C-0600
Revision of report dated Jun 79, AD-A070 882.

Several algorithms have been proposed for the computation of maximum likelihood estimates for contingency tables. Since multinomial logit response models can be treated as special versions of log-linear models, many of these techniques can be used for logit models as well. In this paper we compare, in a qualitative fashion, the relative merits of (1) two variants of Newton's method developed by Fienberg and Stewart; (2) GLIM, as developed by Nelder and Wedderburn; (3) the BMDP program for stepwise logistic regression; and (4) the widely used method of iterative proportional fitting. (Author)

AD-A089 427/9 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Information and Decision Systems
Stability and Convergence of Adaptive Control Algorithms: A Survey and Some New Results.
Interim rept.,
Lena S. Valavani. May 80, 14p LIDS-P-989, AFOSR-TR-80-0778
Grant AFOSR-77-3281

Although adaptive controllers have been designed for a number of years, the central question of global asymptotic stability of the overall feedback adaptive loop and its associated error equations remained open until recently. The two main approaches used to design controllers from a stability viewpoint - Lyapunov's Direct Method and Popov's Hyperstability Theory - only assure boundedness of the (augmented) state and parameter errors. The difficulties encountered in both approaches are analyzed and shown to be exactly analogous. Subsequently, a generic model for an adaptive controller is proposed from which already existing adaptive algorithms can be derived with minor modifications. The model unifies various algorithms, under the essential requirement for positive reality of the associated error transfer function, and its proof of stability contains others suggested to date as special cases. Finally some general comments are made regarding rates of convergence, performance of the algorithms in the presence of disturbances and unmodeled dynamics, ease of implementation, etc. (Author)

AD-A089 474/1 PC **A02**/MF **A01**
Florida Univ Gainesville Dept of Mathematics
On Partial Realizations, Transfer Functions, and Canonical Forms,
R. E. Kalman. 1979, 24p AFOSR-TR-80-0818
Grants AFOSR-76-3034, DAAG29-77-G-0225
Pub. in Acta Polytechnica Scandinavica, v31 p9-32 1979.

No abstract available.

AD-A089 486/5 PC **A03**/MF **A01**
Stanford Univ CA Dept of Operations Research
What is the Worst Case Behavior of the Simplex Algorithm.
Technical rept.,
Norman Zadeh. 1 May 80, 30p Rept no. TR-37
Contract N00014-75-C-0493, Grant NSF-ENG76-12266

The examples published by Klee and Minty in 1972 do not preclude the existence of a pivot rule which will make the simplex method, at worst, polynomial. In fact, the continuing success of Dantzig's method suggests that such a rule does exist. A study of known examples shows that (a) those which use 'selective' pivot rules require exponentially large coefficients, and (b) none of the examples' pivot rules are typically used in practice, either because of computational requirements or due to a lack of even-handed movement through the column set. In all 'bad' problems, certain improving columns are entered about 2 to the m-2 power times before other improving columns are entered once. This is done by making the unused columns 'appear' to yield small objective function improvement. The purpose of this paper is to explain the Klee-Minty and Jeroslow constructions, show how they can be modified to be pathological with small integral coefficients, and then suggest a 'least entered' pivot rule which forces an improving column to be entered before any other column is entered for the second time. This rule seems immune to the 'deformed product construction' which is the essence of all known exponential counterexamples. (Author)

AD-A089 501/1 PC **A13**/MF **A01**
Naval Postgraduate School Monterey CA
Parametric Modeling of Linear and Nonlinear Systems,
Doctoral thesis,
Francis Anthony Perry. Jun 80, 286p

The problem of obtaining parametric models for linear and nonlinear systems based on observations of the input and output of the system is one of wide ranging interest. For linear systems, moving average (MA) and autoregressive (AR) models have received considerable attention and, based on the Levinson algorithm, a number of very powerful methods involving lattice filter structures have been developed to obtain the model solutions. For nonlinear systems the Volterra series model which is a nonlinear extension of the moving average model is frequently used. The purpose of this research is to extend these techniques to more general linear and nonlinear models. Using the equation error formulation, lattice solution methods in batch processing and adaptive form are developed for both single and multichannel autoregressive moving average (ARMA) models for linear systems and Volterra series models for nonlinear systems. A nonlinear extension of the ARMA model is also considered and is shown in some cases to remedy problems encountered in Volterra modeling of nonlinear systems. Lattice methods are also developed for the nonlinear ARMA model and it is shown that the methods obtained for linear ARMA modeling follow as a special case of the nonlinear results.

AD-A089 502/9 PC **A03**/MF **A01**
Stanford Univ CA Dept of Statistics
The Von Mises Distribution in p-Dimensions with Applications.
Technical rept.,
Michael A. Stephens. 4 Aug 80, 34p Rept no. TR-290
Contract N00014-76-C-0475

The theory of the von Mises distribution in p-dimensions is summarized, and it is shown how one or more sets of unit vectors, with p components, can be analyzed using this distribution. In particular, some extensions are made on the analysis of variance techniques first developed by Watson for two and three dimensions. An application is given to the analysis of continuous proportions for which the techniques supply a good methodology. Other examples are also briefly discussed. (Author)

AD-A089 507/8 PC **A02**/MF **A01**
Stanford Univ CA Dept of Electrical Engineering
Factorization Methods for Discrete Sequential Estimation,
Thomas Kailath. 1979, 3p AFOSR-TR-80-0812
Contracts F49620-79-C-0058, DAAG29-79-C-0215
Pub. in IEEE Transactions on Information Theory, vIT-26 n1 p130-131 Jan 80.

No abstract available.

AD-A089 506/6 PC **A02**/MF **A01**
Stanford Univ CA Dept of Electrical Engineering
The Factorization and Representation of Operators in the Algebra Generated by Toeplitz Operators,
T. Kailath, B. Levy, L. Ljung, and M. Morf. 11 Oct 78, 21p AFOSR-TR-80-0811
Contracts F49620-79-C-0058, F44620-74-C-0068
Pub. in SIAM Jnl. of Applied Mathematics, v37 n3 p467-484 Dec 79. Sponsored in part by Contract N00014-75-C-0601.

No abstract available.

AD-A089 509/4 PC **A02**/MF **A01**
Stanford Univ CA Dept of Electrical Engineering
Properties of the System Matrix of a Generalized State-Space System,
G. Verghese, P. Van Dooren, and T. Kailath. 16 Oct 78, 11p AFOSR-TR-80-0813
Contracts F44620-74-C-0068, N00014-75-C-0601
Pub. in International Jnl. of Control, v30 n2 p235-243 1979. Sponsored in part by Grant NSF-ENG75-03423.

No abstract available.

AD-A089 510/2 PC **A02**/MF **A01**
Stanford Univ CA Dept of Electrical Engineering
Displacement Ranks of a Matrix,
T. Kailath, S.-Y. Kung, and M. Morf. 22 Jun 78, 6p AFOSR-TR-80-0810
Contracts F44620-74-C-0068, MDA903-78-C-0179
Pub. in Bulletin of the American Mathematical Society, v1 n5 p769-773 Sep 79.

No abstract available.

AD-A089 529/2 PC **A04**/MF **A01**
Stanford Univ CA Dept of Statistics
Growth Rates of Moment Sequences.
Technical rept.,
William L. Harkness. 30 Jul 80, 54p Rept no. TR-289
Contract N00014-76-C-0475

General properties of growth rates of moment sequences of nonnegative random variables are presented. Then asymptotic results on moment sequences are derived for two classes of distribution functions. Explicitly, let a monotone be increasing twice differentiable regularly varying function at infinity. A second class of distribution functions is defined. Finally, several examples are given to illustrate the possible different asymptotic growth rates of moments.

AD-A089 544/1 PC **A02**/MF **A01**
California Univ Berkeley Electronics Research Lab
On the Generalized Nyquist Stability Criterion,
Charles A. Desoer, and Yung-Terng Wang. 12 Feb 79, 11p AFOSR-TR-80-0910
Contract F49620-79-C-0178, Grant NSF-ENG76-84522
Pub. in IEEE Transactions on Automatic Control, vAC-25 n2 p187-196 Apr 80.

No abstract available.

AD-A089 550/8 PC **A02**/MF **A01**
Kentucky Univ Lexington Dept of Mathematics
On the Mayne-Fraser Smoothing Formula and Stochastic Realization Theory for Nonstationary Linear Stochastic Systems,
Faris Badawi, Anders Lindquist, and Michele Pavon. 1979, 9p AFOSR-TR-80-0780
Grants AFOSR-78-3519, NSF-ENG79-03731
Pub. in Proceedings of the Conference on Decision and Control, p1-7 Dec 79.

No abstract available.

AD-A089 576/3 PC **A02**/MF **A01**
Southern Methodist Univ Dallas TX Dept of Statistics
Biased Estimation in Regression.
Final rept. 1 Jul 79-30 Jun 80,
Richard F. Gunst. Aug 80, 12p AFOSR-TR-80-0865
Contract F49620-79-C-0106

Summarized in the report are four scholarly papers that have been published during the contract period and four other articles which are in various stages of submission for publication. Several other

activities directly connected with this research are briefly discussed. A list of all research articles published since the commencement of the contract concludes the report.

AD-A089 588/8 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Theoretical and Practical Aspects of Singularity and Eigenmode Expansion Methods.
Technical summary rept.,
A. G. Ramm. Mar 80, 21p Rept no. MRC-TSR-2051
Contracts DAAG-29-75-C-0024, F49620-79-C-0128

Foundations of singularity and eigenmode expansion methods and some practical questions related to the theory are discussed. (Author)

AD-A089 589/6 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Local Piecewise Polynomial Projection Methods for an ODE which Give High-Order Convergence at Knots.
Technical summary rept.,
Carl de Boor, and Blair Swartz. May 80, 22p Rept no. MRC-TSR-2072
Contracts DAAG29-80-C-0041, DAAG29-75-C-0024
Sponsored in part by contract W-7405-Eng-36.

Local projection methods which yield C(m-1) piecewise polynomials of order m+k as approximate solutions of a boundary value problem for an m(th) order ordinary differential equation are determined by the k linear functionals at which the residual error in each partition interval is required to vanish. We develop a condition on these k functionals which implies breakpoint superconvergence (of derivatives of order less than m) for the approximating piecewise polynomials. The same order of super-convergence is associated with eigenvalue problems. (Author)

AD-A089 610/0 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
New Applications of Generalised Curves. Particularly in Physics.
Technical summary rept.,
L. C. Young. May 80, 22p Rept no. MRC-TSR-2067
Contracts DAAG29-75-C-0024, DAAG29-80-C-0041

The traditional assumptions of infinitesimal smoothness, implicitly made in various applied topics, do not agree with what is observed at microscopic and smaller dimensions. Mathematical models closer to what actually occurs, are made possible by the theory of generalised curves, and by the matching up and resonance of the infinitesimal patterns they generate. Phenomena hitherto not fully accounted for, may be partly due to such generalised patterns in stress lines of bridges, streamlines of shock waves, and rays of light. In relativistic quantum physics, generalised curves appear on account of the indefiniteness of the metric, and the infinitesimal zigzagging corresponds to successive emission and absorption of radiation. The Nowosad theory, a preview of which is given here, accounts in this way for the elementary particles in a logical manner, and provides at the same time de Broglie's Pilot Wave and the quantum potentials of Bohm and Vigier. Moreover such things as the Pauli exclusion become theorems. The theory makes uses of singular integrals and of reduced quaternion-valued analytic functions. (Author)

AD-A089 633/2 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Collocation Approximation to Eigenvalues of an Ordinary Differential Equation: Numerical Illustrations.
Technical summary rept.,
Carl de Boor, and Blair Swartz. May 80, 32p Rept no. MRC-TSR-2080
Contracts DAAG29-80-C-0041, DAAG29-75-C-0024
Sponsored in part by Contract W-7405-eng-36.

We display the numerical results associated with the collocation of three eigenvalue problems using from one to four Gauss points per partition interval in order to document the sharpness of the error bounds we have previously obtained. The ordinary differential operators involved are real with constant coefficients; two of the problems have an eigenvalue whose ascent exceeds one. We propose an explanation for the observed manner in which a set of simple approximate eigenvalues can approach a single multiple eigenvalue. (Author)

AD-A089 635/7 PC **A09**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Spectral Theory of Matrices. I. General Matrices.
Technical summary rept.,
Shmuel Friedland. May 80, 185p Rept no. MRC-TSR-2082
Contracts DAAG29-75-C-0024, DAAG29-80-C-0041

This is the first of our survey reports on the spectral theory of matrices. The report is self contained from the matrix point of view. The main subject of this paper is the theory of analytic similarity of matrices. This topic of matrix theory is very important in the study of systems of ordinary differential equations having singularities either in time or a parameter. (Author)

AD-A089 636/5 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Representations of Intervals and Optimal Error Bounds.
Technical summary rept.,
L. B. Rall. Jul 80, 22p Rept no. MRC-TSR-2098
Contract DAAG29-80-C-0041

Calculations with interval arithmetic and interval extensions of real functions are often used to obtain lower and upper bounds for what would be the theoretical results of precise computations on exact data. A more traditional way to represent approximate data and results contained in intervals is by means of a representative point x in the interval and an associated measure of error E. For example, the midpoint of an interval has absolute error as an approximation to other points of the interval which is bounded by half the width of the interval. In general, the chosen point is said to be optimal with respect to the measure of error if the maximum value of E over the interval is minimized. A general method for determination of optimal points x and minimal error bounds E is given.

AD-A089 637/3 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Implicit Degenerate Evolution Equations and Applications.
Technical summary rept.,
Emmanuele DiBenedetto, and R. E. Showalter. Jul 80, 41p Rept no. MRC-TSR-2099
Contracts DAAG29-80-C-0041, DAAG29-75-C-0024
Sponsored in part by Grant NSF-MCS78-09525.

The initial-value problem is studied for evolution equations in Hilbert space of the general form d/dt A(u) + B(u) not an element of f where A and B are maximal monotone operators. Existence of a solution is proved when A is a subgradient and either A is strongly-monotone or B is coercive; existence is established also in the case where A is strongly-monotone and B is subgradient. Uniqueness is proved when one of A or B is continuous self-adjoint and the sum is strictly-monotone; examples of nonuniqueness are given. Applications are indicated for various classes of degenerate nonlinear partial differential equations or systems of mixed elliptic-parabolic-pseudoparabolic types and problems with non-local nonlinearity.

AD-A089 641/5 PC **A04**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Some Aspects of Model Estimation and Model Criticism.
Technical summary rept.,
Steven P. Bailey, and George E. P. Box. May 80, 52p Rept no. MRC-TSR-2084
Contracts DAAG29-75-C-0024, DAAG29-80-C-0041

The recently advanced philosophy of model building is developed further. It is stressed how Bayesian inferences based on the posterior distribution of the model parameters are appropriate only after sampling theory inferences based on the predictive distribution of the data fail to discredit the model. An example involving the normal distribution is discussed in detail. Diagnostic checking functions are developed which can be applied in an intuitive sequential manner. Careful attention is also given to the nature of the predictive distribution for the extreme situation where information about the parameters is very precise or very vague. For the latter case, it is illustrated how the predictive distribution can simultaneously (i) reflect this vague information in an appropriate manner and (ii) allow for the checking of the adequacy of the basic distributional assumptions such as normality and independence. A particular problem in the interpretation of predictive distributions arises in situations involving a discrete data-generating distribution with vague prior knowledge about the parameter(s). This problem is explored in depth for the case of the binomial distribution. (Author)

AD-A089 642/3 PC **A04**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Modeling the Nature and Frequency of Outliers.
Technical summary rept.,
Steven P. Bailey, and George E. P. Box. May 80, 63p Rept no. MRC-TSR-2085
Contracts DAAG29-80-C-0041, DAAG29-75-C-0024

Bayesian techniques are applied to the problem of dealing with the possible occurrence of outlying observations. Since most experimental data are liable to occasional discrepancies, a robustification approach is taken whereby this experimental 'fact of life' is taken into account in the model. Special consideration is given to the way in which both the nature and the frequency of the outlying observations are modeled. In this regard, the Bayesian outlier procedure of Box and Tiao, which assumes a contaminated error distribution with alpha denoting the frequency of contamination, is developed further. In particular, alpha is not assumed to be known, but rather, a prior distribution is used to express uncertainty about its value. When combined with the information about alpha contained in the data itself, it is seen that appropriate inferences about this outlier frequency can be made. A detailed example is presented. (Author)

AD-A089 643/1 PC **A04**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
The Duality of Diagnostic Checking and Robustification in Model Building: Some Considerations and Examples.
Technical summary rept.,
Steven P. Bailey, and George E. P. Box. Jun 80, 54p Rept no. MRC-TSR-2086
Contracts DAAG29-75-C-0024, DAAG29-80-C-0041

Consideration is given to the means by which appropriate diagnostic checking functions of the data can be developed to guard against feared model discrepancies. A formal basis for the selection of a function is given for situations where the feared inadequacy can be characterized by a discrepancy parameter beta which takes a (possible inappropriate) value of beta sub zero in the model. The relationship of this checking function with the posterior distribution obtained from an elaborated ('robustified') model which allows for the discrepancy parameter to be estimated is discussed. The nature of the diagnostic check is briefly described for problems relating to transformation of the dependent variable and to serial correlation; while a more thorough investigation of the checking function is given for problems relating to outlying observations and to transformation of predictor variables. Several examples are given to illustrate these ideas.

AD-A089 644/9 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center

Integration of Interval Functions.
Technical summary rept.,
Ole Caprani, Kaj Madsen, and L. B. Rall. Jun 80, 37p Rept no. MRC-TSR-2087
Contracts DAAG29-80-C-0041, DAAG29-75-C-0024

The lack of a theory of integration of interval functions has hampered the development of interval methods for the solution of integral equations, which constitute an important class of mathematical models of real situations. This report provides such a theory by defining integrals of interval functions to be an interval with the limits of integrals of step-functions respectively less and greater than the integrand as endpoints. As these lower and upper Darboux integrals of basic integration theory always exist, it follows that all interval functions are integrable. The simplicity of this theory is due to the fact that intervals, rather than real numbers only, are accepted as values of integrals, even if the integrand is a real function (called a degenerate interval function in this context). Some useful properties of the interval integral defined in this report are derived, and its potential usefulness in connection with the numerical solution of integral equations is indicated.

AD-A089 650/6 PC **A03**/MF **A01**
California Univ Los Angeles Dept of Mathematics
Scheme-Independent Stability Criteria for Difference Approximations of Hyperbolic Initial-Boundary Value Problems. II.
Interim rept.,
Moshe Goldberg, and Eitan Tadmor. Aug 80, 47p AFOSR-TR-80-0929
Grants AFOSR-76-3046, AFOSR-79-0127
Prepared in cooperation with Tel-Aviv Univ. (Israel). Dept. of Mathematical Sciences, Grant AFOSR-76-3035. See also AD-A055 022.

Convenient stability criteria are obtained for difference approximations to hyperbolic initial-boundary value problems. The approximations consist of arbitrary basic schemes and a wide class of boundary conditions. The new criteria are given in terms of the outflow part of the boundary conditions and are independent of the basic scheme. The results easily imply that a number of well known boundary treatments, when used in combination with arbitrary stable basic schemes, always maintain stability. Consequently, many special cases studied in recent literature are generalized. (Author)

AD-A089 652/2 PC **A02**/MF **A01**
Wisconsin Univ-Madison Dept of Statistics
A Note on a Difficulty Inherent in Estimating Reliability from Stress-Strength Relationships.
Technical rept.,
Bernard Harris, and Andrew P. Soms. Aug 80, 6p Rept no. UWIS-DS-80-614
Contracts N00014-79-C-0321, DAAG29-80-C-0041

This note calls attention to a difficulty which arises frequently in the application of stress-strength methods in reliability theory. This difficulty has led to unanticipated catastrophic failures in a number of applications.

AD-A089 655/5 PC **A02**/MF **A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
An Approximation Scheme for Delay Equations.
Interim rept.,
Franz Kappel. 16 Jun 80, 20p AFOSR-TR-80-0924
Contract DAAG29-79-C-0161, Grant AFOSR-76-3092

We present a general approximation scheme for autonomous FDE's with Lipschitzean right-hand side. Our approach is based on approximation results in semigroup theory. The results are applied to nonlinear autonomous FDE's in the state space IR to the nth power x L to the 2nd power and to linear autonomous FDE's of neutral type in the state spaces IR to the nth power x L to the 2nd power and W to the 2nd power. (Author)

AD-A089 656/3 PC **A02**/MF **A01**
Florida State Univ Tallahassee Dept of Statistics
Small Sample Properties of Two Survival Function Estimators Based on Incomplete Data.
Technical rept.,
Yuan-Yan Chen, Myles Hollander, and Naftali A. Langberg. Jul 80, 21p FSU-STATISTICS-M550, TR-78-112, AFOSR-TR-80-0931

For estimating an underlying survival distribution, we consider two estimators based on a randomly right-censored sample: The traditional Product Limit Estimator (PLE), introduced by Kaplan and Meier (1958), and a competitor, the Piecewise Exponential Estimator (PEXE), introduced by Kitchin, Langberg, and Proschan (1980a). Under a proportional hazards model we present formulas for the mean and variance of the PLE and find upper and lower bounds for mean and variance of the PEXE. These new expressions for finite sample sizes are compared with known asymptotic results. (Author)

AD-A089 661/3 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
On the Generalized Euler-Frobenius Polynomial.
Technical summary rept.,
Y. Y. Feng, and J. Kozak. Jun 80, 17p Rept no. MRC-TSR-2088
Contracts DAAG29-80-C-0041, DAAG29-75-C-0024

In this paper the properties of the generalized Euler-Frobenius polynomial are studied. It is proved that its zeroes are separated by a factor q and their asymptotic behavior as Q approaches infinity is obtained. As a consequence it is shown that least squares spline approximation on a biinfinite geometric mesh is boundable independently of the (local) mesh ratio q and that the norm of the inverse of the corresponding B-spline Gram matrix decreases monotonly to 2k - 1 for large q, as Q approaches infinity.

AD-A089 662/1 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
A Mathematical Model for Linear Elastic Systems with Structural Damping.
Technical summary rept.,
G. Chen, and D. L. Russell. Jun 80, 32p Rept no. MRC-TSR-2089
Contracts DAAG29-80-C-0041, DAAG29-75-C-0024
Sponsored in part by grant AFOSR-79-0018.

From empirical studies it is known that the natural modes of vibration of elastic systems have damping rates which are roughly proportional to the frequency of vibration. A number of ad hoc models exhibiting behavior of this type have been proposed in the engineering literature but they are not true dynamical systems nor are they very useful for numerical computations. In this paper we present a model of the form with B, A positive, unbounded, self-adjoint operators on a Hilbert space X, exhibiting the damping behavior just described, which is known as structural damping. Finite dimensional analogs suitable for computation of approximate solutions are also noted. (Author)

AD-A089 664/7 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
A Counterexample for the Trotter Product Formula.
Technical summary rept.,
Thomas G. Kurtz, and Michel Pierre. Jun 80, 14p Rept no. MRC-TSR-2091
Contracts DAAG29-80-C-0041, DAAG29-75-C-0024
Sponsored in part by grant NSF-MCS78-09525.

This report describes linear m-accretive operators A sub 1 and A sub 2 whose sum is m-accretive but for which the associated product formulas do not converge.

AD-A089 666/2 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Bounds for Optimal Confidence Limits for Series Systems.
Technical summary rept.,
Bernard Harris, and Andrew P. Soms. Jun 80, 22p Rept no. MRC-TSR-2093
Contracts N00014-79-C-0321, DAAG29-80-C-0041
Sponsored in part by Contract DAAG29-75-C-0024.

Lindstrom-Madden type approximations to the lower confidence limit on the reliability of a series system are theoretically justified by extending and simplifying the results of Sudakov (1973). Applications are made to Johns (1976) and Winterbottom (1974). Numerical examples are presented. (Author)

AD-A089 667/0 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
On Local Linear Functionals for L-Splines.
Technical summary rept.,
Rong-Qing Jia. Jun 80, 18p Rept no. MRC-TSR-2094
Contract DAAG29-80-C-0041

Quasi-interpolant functionals for L-splines are constructed. With them as a tool, an explicit construction of LB-splines is done, and a quick proof of the existence and uniqueness of the expansion of an L-spline in an LB-spline series is given. Moreover, a necessary and sufficient condition for a function, under which it generates a local linear functional that vanishes at all LB-splines but one, is obtained. (Author)

AD-A089 668/8 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
A Nonlinear Hyperbolic Volterra Equation in Viscoelasticity.
Technical summary rept.,
C. M. Dafermos, and J. A. Nohel. Jun 80, 36p Rept no. MRC-TSR-2095
Contract DAAG29-80-C-0041, Grant DAAG27-76-G-0294
Sponsored in part by Grant NSF-MCS-79-05774.

A general model for the nonlinear motion of a one dimensional, finite, homogeneous, viscoelastic body is developed and analysed by an energy method. It is shown that under physically reasonable conditions the nonlinear boundary, initial value problem has a unique, smooth solution (global in time), provided the given data are sufficiently 'small' and smooth, moreover, the solution and its derivatives of first and second order decay to zero as t yields infinity. Various modifications and generalizations, including two and three dimensional problems, are also discussed.

AD-A089 680/3 PC **A03**/MF **A01**
Colorado State Univ Fort Collins Dept of Electrical Engineering
Covariance Sequence Approximation for Parametric Spectrum Modelling.
Technical rept.,
Louis L. Scharf, and A. A. Louis Beex. Aug 80, 35p Rept no. CSU-TR-AUG80-1
Contract N00014-75-C-0518

Parametric methods of spectrum analysis are founded on finite-dimensional models for covariance sequences. Rational spectrum approximants for continuous spectra are based on autoregressive (AR), moving average (MA), or autoregressive moving average (ARMA) models for covariance sequences. Line spectrum approximants to discrete spectra are based on cosinusoidal models for covariance sequences. In this paper we make the point that a wide variety of spectrum types admit to modal analysis wherein the modes are characterized by amplitudes, frequencies, and damping factors. The associated modal decomposition is appropriate for both continuous and discrete components of the spectrum. The domain of attraction for the decomposition includes ARMA sequences, harmonically- or nonharmonically-related sinusoids, damped sinusoids, white noise, and linear combinations of these. The parametric spectrum analysis problem now becomes one of identifying mode parameters. This we achieve by solving two modified least squares problems. Numerical results are presented to illustrate the identification of mode parameters and corresponding spectra from finite records of perfect and estimated covariance sequences. The results for sinusoids and sinusoids in white noise are interpreted in terms of in-phase and quadrature effects attributable to the finite record length. (Author)

AD-A089 684/5 PC **A04**/MF **A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
Approximation Schemes for Nonlinear Neutral Optimal Control systems.
Interim rept.,
Karl Kunisch. 7 May 80, 55p AFOSR-TR-80-0925
Contract DAAG29-79-C-0161, Grant AFOSR-76-3092

We discuss methods of approximating stable neutral functional differential equations and associated optimal control problems by sequences of optimal control problems for ordinary differential equations. By introducing a class of 'mollified' neutral func. differential equations, convergence of the linear interpolating spline and the averaging approximation scheme is proved. A number of numerical examples is included. (Author)

AD-A089 685/2 PC **A02**/MF **A01**
Florida State Univ Tallahassee Dept of Statistics
A New Method for Estimating Life Distributions from Incomplete Data.
Interim rept.,
John Kitchin, Naftali A. Langberg, and Frank Proschan. May 80, 23p FSU-STATISTICS-M548, TR-78-109-AFOSR, AFOSR-TR-80-0932
Grant AFOSR-78-3678

We construct a new estimator for a continuous life distribution from incomplete data, the Piecewise Exponential Estimator (PEXE). We show that the PEXE is strongly consistent under a mild restriction on the distribution of the censoring random variables (possible non-identical and non-continuous). Then we consider the Product Limit Estimator (PLE), introduced by Kaplan and Meier (1958). We prove the strong consistency of the PLE under a mild regularity condition on the distributions of the censoring random variables. This result extends previous ones obtained by various researchers. Finally we compare the new PEXE and traditional PLE. (Author)

AD-A089 687/8 PC **A03**/MF **A01**
Florida State Univ Tallahassee Dept of Statistics
Testing Whether New is Better than Used with Randomly Censored Data.
Interim rept.,
Yuan-Yan Chen, Myles Hollander, and Naftali A. Langberg. Jun 80, 29p FSU-STATISTICS-M503, TR-78-12-AFOSR, AFOSR-TR-80-0943
Grant AFOSR-78-3678

A life distribution F (a distribution function (d.f.) such that $F(x) = 0$ for $x < 0$), with survival function the superior limit of F is approximately 1-F is new better than used (NBU). The dual notion of a new worse than used (NWU) life d.f. is defined by reversing the inequality. The boundary members of the NBU and NWU classes, obtained by insisting an equality, are the exponential d.f.'s. The NBU class of life distributions has proved to be very useful in performing analyses of lifelengths. These d.f.'s provide readily interpretable models for describing wearout, play a fundamental role in studies of replacement policies (Marshall, Proschan, 1972), and shock models (Esary, Marshall, And Proschan, 1973), and have desirable closure properties (c.f. Barlow and Proschan, 1975).

N80-32150/8 PC **A13**/MF **A01**
Magnetic Observatory, Hermanus (South Africa).
Workshop on Digital Time Series Analysis with Geophysical Applications.
5 Jun 80, 293p CSIR-S-238, ISBN-0-7988-1889-1
Workshop Help at Hermanus, South Africa, 22-24 Apr. 1980.

Fourier transforms, digital filtering, and maximum entropy spectral analysis are among the principal topics discussed in twenty-two unedited papers. The use of these techniques in astronomical photometry and in seismology is discussed. Other applications of time series analysis such as predicting rainfall in South Africa, determining the resonance of Table Bay harbor, analyzing geomagnetic pulsations, measuring ocean surface waves, differentiating noisy data, and measuring vector currents, the autocorrelation analysis of atmospheric pressure, and a digital autocorrelation spectrometer and radio astronomical spectral analysis are also considered.

12B. Operations Research

AD-A089 351/1 PC **A04**/MF **A01**
Stanford Univ CA Systems Optimization Lab
MINOS/AUGMENTED User's Manual.
Technical rept.,
Bruce A. Murtagh, and Michael A. Saunders. Jun 80, 57p Rept no. SOL-80-14
Contracts DAAG29-79-C-0110, N00014-75-C-0267
Sponsored in part by Grants DE-AC03-76-SF-00326, DE-AT03-76-ER-72018, NSF-MCS79-26009 and NSF-ENG77-06761.

The scope of this manual is restricted to matters additional to those covered in the MINOS User's Guide (2). We assume that you are either already familiar with that manual, or at least have a copy at hand to refer to. Unless nonlinearities are specified, MINOS/AUGMENTED solves the standard linear programming problem, using a reliable implementation of the revised simplex method. (A sparse LU factorization of the basis matrix is computed using the 'bump and spike' algorithm of Hellerman and Rarick, and this is updated in a stable manner by the method of Bartels and Golub.) (Author)

AD-A089 540/9 MF **A01**
Stanford Univ CA Dept of Operations Research
Tables of Queue Size and Waiting Time Distributions for M/M/c, M/D/c, and D/M/c Queueing Systems.
Technical rept.,
David M. Avis, Larry A. Edison, Lawrence D. Fossett, Frederick S. Hillier, and Martin I. Reiman. Mar 80, 95p Rept nos. TR-90, TR-57
Contract N00014-76-C-0418, Grant NSF-ENG75-14847
Availability: Microfiche copies only.

This report provides a relatively comprehensive set of tables describing the steady-state behavior of M/M/c, M/D/c, and D/M/c queueing systems. The results given are the probability distribution of the number of customers in the system (including those being served) and of the waiting time of individual customers in the queue (excluding service time), as well as the expected number of customers in the queue (excluding those being served). The cases considered are $c = 1,2,...,10$ and $c = 15$ for all three classes of queueing systems, plus $c = 12$ for M/Dc and $c = 20,25$ for M/M/c. For each case, the results are tabulated for 16 values of the traffic intensity ranging from 0.10 to 0.99. Also included for comparative purposes are the corresponding results for two related cases, D/E2/2 and M/E2/2. These data represent one portion of the output from a large-scale project of theoretical research, algorithmic development, and computational effort to generate the obtainable numerical results for various classes of GI/G/c systems. (Author)

AD-A089 541/7 MF **A01**
Stanford Univ CA Dept of Operations Research
Tables of Queue Size Distribution for Queueing Systems with Erlang Interarrival Times.
Technical rept.,
David M. Avis, Larry A. Edison, Lawrence D. Fossett, Frederick S. Hillier, and Martin I. Reiman. Mar 80, 112p Rept nos. TR-91, TR-58
Contract N00014-76-C-0418, Grant NSF-ENG75-14847
Availability: Microfiche copies only.

This report provides a relatively comprehensive set of tables describing the steady-state behavior of certain basic types of queueing systems having an Erlang distribution for the interarrival times. (Author)

AD-A089 542/5 PC **A06**/MF **A01**
Stanford Univ CA Dept of Operations Research
The Staircase and Related Structures in Integer Programming.
Technical rept.,
Lynne J. Pollenz. Jun 80, 113p Rept nos. TR-94, TR-80-13
Contract N00014-76-C-0418, Grant NSF-MCS76-81259
See also AD-A089 543.

With the advent of the computer age, linear programming has become a major tool for practical problem solving. Integer programming applications are also widespread, but unfortunately no interger programming solution method has been as successful as the simplex method for linear programming. However, it is often possible to improve considerably on computation time by exploiting the special structure of a problem. One common special structure, the staircase structure, occurs frequently in multitime period models. (Author)

AD-A089 543/3 MF **A01**
Stanford Univ CA Dept of Operations Research
A Computer Program for the Staircase Integer Programming Problem.
Technical rept.,
Lynne J. Pollenz. Jul 80, 65p Rept nos. TR-95, TR-80-16
Contract N00014-76-C-0418, Grant NSF-MCS76-81259
See also AD-A089 542.
Availability: Microfiche copies only.

The computer code SDA to be described in this report solves the staircase integer linear programming problem. This formulation arises in multiplant production allocation problems, multisector economic planning models, and multitime period production and inventory problems. The solution method used by the program SDA relies upon decomposition of the problem (SP) into smaller subproblems (St), each of which can then be efficiently solved by an LP-based branch-and-bound routine. (Author)

AD-A089 620/9 PC **A03**/MF **A01**
Stanford Univ CA Dept of Operations Research
An Accelerated Covering Relaxation Algorithm for Solving 0-1 Positive Polynomial Programs.
Technical rept.,
Daniel Granot, Frieda Granot, and Willem Vaessen. Jun 80, 27p Rept nos. TR-93, TR-30-10
Contract N00014-76-C-0418, Grant NSF-MCS76-81259

The purpose of this paper is to present an accelerated algorithm for solving 0-1 positive polynomial (PP) problems of finding a 0-1 vector x that maximizes cx subject to f(x) less than or = b, where f(x) = f sub i (x)) is an m-vector of polynomials with nonnegative coefficients. Like our covering relaxation algorithm (1979) the accelerated algorithm is a cutting-plane method in which each relaxed problem is a set covering problem and the cutting planes are linear covering constraints. However by contrast with other cutting-plane methods in integer programming (including our original method), we do not solve the relaxed problems to optimality after the introduction of the cutting-plane constraints. Rather, we first solve each relaxed set-covering problem heuristically and only if the heuristic solution is feasible for PP do we solve the relaxed problem to optimality. The promise of such an approach stems from the excellent performance of the various heuristic algorithms for solving integer programs. Indeed the extensive computational experimentation we performed reveals that the accelerated approach has reduced significantly both the number of covering problems solved to optimality and the computational time required to solve a PP problem. For example the average computational time required to solve a PP problem with 40 variables and an average of 10.5 terms per constraints and 3 variables per term was reduced using the accelerated method from 84.7 to 25.8 seconds while the average number of covering problems solved to optimality was reduced from 11.5 to 3.8. (Author)

AD-A089 639/9 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Coexistence Properties of Some Predator-Prey Systems under Constant Rate Harvesting and Stocking.
Technical summary rept.,
F. Brauer, and A. C. Soudack. Aug 80, 35p Rept no. MRC-TSR-2101
Contract DAAG29-80-C-0041

The global behaviour of a class of predator-prey systems, modelled by a pair of non-linear ordinary differential equations, under constant rate harvesting and/or stocking of both species, is presented. Theoretically possible structures and transitions

are developed and validated by computer simulations. The results are presented as transition loci in the F-G (prey harvest rate - predator harvest rate) plane. (Author)

AD-A089 658/9 PC **A03**/MF **A01**
Michigan Univ Ann Arbor Computer Information and Control Engineering Program
Sojourn Times in Markov Queueing Networks: Little's Formula Revisited.
Interim rept.,
Frederick J. Beutler. Jun 80, 37p AFOSR-TR-80-0923
Grants AFOSR-76-2903, NSF-ENG75-20223

It is commonly supposed that L = lambda W applies to 'almost any' queueing system, with lambda the mean customer entrance rate, L the asymptotic expectation of the number of customers in the system, and W the asymptotic sojourn time expectation. We study the formula for irreducible positive recurrent Markov queueing systems whose state vector Z consists of entries representing queue lengths at the respective service stations; such a model permits blocking, finite capacities, jockeying, state-dependent or random routing, bulk and/or Erlang service, and variable arrival and service rates. To define waiting times under various queueing disciplines, Z is augmented by a customer location process to yield the new Markov process Y = (Z,U). It is shown that the standard regenerative process proof of Little's equality fails in the absence of further hypotheses; however, additional assumptions assure the validity of L = lambda W for a broad variety of queueing disciplines.

N80-32178/9 PC **A05**/MF **A01**
Technion - Israel Inst. of Tech., Haifa. Dept. of Aeronautical Engineering.
An Approximate Solution of Singularly Perturbed Non-Linear Pursuit-Evasion Games.
N. Farber, and J. Shinar. Feb 79, 86p TAE-359

A methodology to obtain an approximate solution of a singularly perturbed nonlinear differential game is presented. The outcome of the game with approximate strategies, defined as extended value, is related to the saddle point value of the game. In an example of a simple pursuit-evasion game, it is shown that the proposed methodology leads to an easily implementable feedback form solution with fairly accurate results. This approach seems to be attractive to analyze realistic air combat models without solving a two point boundary value problem.

13.

MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

AD-A089 262/0 PC **A02**/MF **A01**
Civil Engineering Lab (Navy) Port Hueneme CA
Sea/Lake Water Air Conditioning at Naval Facilities.
Final rept. Oct 78-Dec 79,
J. B. Ciani. May 80, 23p Rept no. CEL-TN-1577

The sea/lake water air conditioning (AC) work at CEL and related efforts by others are summarized, along with annotated references. Computer models for estimating the capital costs and energy use for sea/lake water air conditioning (AC) systems are introduced, and the output from these models exercised on two Naval facilities are presented. It was found that (1) the computer models produced reasonable estimates of the capital cost and energy use of seawater AC systems; (2) the capital cost and energy use of such systems are sensitive to the pipeline length, which is dependent on the seawater temperature near the seafloor; (3) at a hypothetical typical Naval facility represented by the average of the two trial facilities, seawater AC requires 80% less energy than conventional AC, but the capital cost of seawater AC is 60% greater; and (4) at this typical facility the life cycle cost for seawater AC is 25% less than that of conventional AC. Sea/lake water AC is recommended for consideration as an alternative to conventional AC at Naval facilities that adjoin bodies of water, and it is also recommended that the computer models be used to make estimates of the capital cost and energy use of sea or lake water AC systems. (Author)

AD-A089 269/5 PC **A04**/MF **A01**
Civil Engineering Lab (Navy) Port Hueneme CA
Cogeneration Systems.
Final rept. Jul 79-Mar 80,
E. E. Cooper. Jun 80, 58p Rept no. CEL-TR-879

Discussions are included of the four broad interrelated categories of factors to consider when evaluating candidate approaches to cogeneration at a site. The categories are technical, economic/financial, legislative/regulatory, and institutional. The inability to resolve difficulties in any area may obviate implementation of cogeneration. Generalized performance curves are presented for cogeneration systems utilizing commercially available steam turbines, diesels, or combustion turbines with heat recovery. A summary is given of federal energy and environmental legislation and regulations currently in effect which impact cogeneration systems. The nature of institutional constraints on implementing cogeneration is also discussed. The potential for cooperative ownership/operation options with utility companies or third party investors is described. The economics of cogeneration is detailed. Finally, steps are listed for proceeding through the categories of factors toward implementation of cogeneration. (Author)

AD-A089 406/3 PC **A03**/MF **A01**
Construction Engineering Research Lab (Army) Champaign IL
Parametric Analysis of Energy Consumption in Army Buildings by the Building Loads Analysis and System Thermodynamics (BLAST) Computer Program.
Final rept.,
Larry M. Windingland. Aug 80, 41p Rept no. CERL-TR-E-162

This report describes the effects varying architectural, construction, and mechanical system features have on the energy consumption of three Army buildings: a barracks, an administration building, and a dental clinic. The three buildings were simulated for five climatological regions centered at Washington, DC; Charleston, SC; Los Angeles, CA; Columbia, MO; and Fort Worth, TX. Energy consumption simulations were done by the Building Loads Analysis and System Thermodynamics (BLAST) computer program. The report shows the percentage difference in annual heating and cooling energy use for three buildings and five locations when variations from the as built insulation levels, orientation, window areas, window types, infiltration levels, mechanical system, and system control strategies are used. It was concluded that insulation levels, window size and type, and infiltration/ventilation rates are the most important architectural and construction features affecting the degree of energy consumption, and that proper selection of mechanical system type and system control strategies can reduce annual energy consumption by up to 50 percent. (Author)

HUD-PDR-481 PC **A08**/MF **A01**
American Planning Association, Chicago, IL.
Site Planning for Solar Access: A Guidebook for Residential Developers and Site Planners.
D. Erley, and M. Jaffe. Sep 79, 156p
Contract EX-76-A-29-1020-001

A guide for developers, site planners, and builders which assists in the design of residential developments for solar access has been compiled. Data included in an evaluation of site selection and analysis are the sun's positions, latitude and topography, atmospheric conditions, existing shading and shading by natural and man-made objects, energy conservation, and site assessment criteria. Criteria reviewed for preliminary site planning include solar access objectives, local regulations, site planning criteria, procedures and an analysis checklist. The relationship of building and site design, building orientation and solar access, and techniques for analyzing solar access are considered. Design strategies to protect solar access include road layout, lot design, open space planning, and siting strategies for single-family detached, low-rise multifamily, and high-rise housing. Other considerations for building orientation include trees, landscaping, and vegetation utilization. Two examples of solar site planning and building orientation are provided. (ERA citation 05:033472)

NUREG/CR-1606 PC **A05**/MF **A01**
Brookhaven National Lab., Upton, NY.
An Evaluation of Condensation-Induced Water Hammer in Preheat Steam Generators,
Pradip Saha, Theodore Ginsberg, Benjamin J. C. Wu, and Owen C. Jones, Jr. Sep 80, 93p BNL-NUREG-51248

At the request of the Division of Systems Safety of USNRC, BNL evaluated the potential of condensation-induced water hammer in preheat type steam generators. Westinghouse 1/8-scale water hammer tests and date analysis were reviewed. BNL has concluded that water hammers occurred in the feedwater line during may of the 1/8-scale tests and were probably caused by steam bubble entrapment and collapse in the partially-filled feedwater line. The Westinghouse scaling laws were also independently reviewed. The present state-of-the-art on the condensation heat transfer and the mechanism of vapor cavity formation precludes use from deriving any credible scaling criteria. However, under certain operation conditions the condensation-induced voil collapse could be an oscillatory process. This may partially explain the apparent randomness of the water hammer phenomenon seen in most experimental studies. The full-scale preheat type steam generators of both the Westinghouse and the Combustion Engineering design have been reviewed from the viewpoint of condensation-induced water hammer. It is recommended that each plant should be reviewed separately to identify the worst situation(s) for the condensation-induced water hammer, and the appropriate verification test(s) should be performed in plants. In addition, basic research should be sponsored in order to enhance our understanding in this area.

N80-31872/8 PC **A06**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Economic Evaluation for Elcam-Tempe, Tempe, Arizona and Elcam-San Diego, San Diego, California.
Final Report.
Jun 80, 102p NASA-CR-161492
Contract NAS8-32036
Prepared for DOE.

The long term economic performance of the solar energy system at its installation site is analyzed and four additional locations selected to demonstrate the viability of the design over a broad range of environmental and economic conditions. The economic analysis of the solar energy systems that were installed at Tempe, Arizona and San Diego, California, is developed for these and four other sites typical of a wide range of environmental and economic conditions in the continental United States. This analysis is accomplished based on the technical and economic models in the f Chart design procedure with inputs based on the characteristics of the installed system and local conditions. The results are expressed in terms of the economic parameters of present worth of system cost over a projected twenty year life: life cycle savings; year of positive savings; and year of payback for the optimized solar energy system at each of the analysis sites. The sensitivity of the economic evaluation to uncertainites in constituent system and economic variables is also investigated. The results demonstrate that the solar energy system is economically viable at all of the sites for which the analysis was conducted.

N80-31878/5 PC **A05**/MF **A01**
Cooperson Brack Associates, Montchanin, DE.
Solar Energy System Demonstration Project at Wilmington Swim School, New Castle, Delaware.
Final Report.
Jul 80, 94p NASA-CR-161538
Contract EM-78-F-01-5190
Sponsored by NASA.

A solar energy system located at the Wilmington Swim School, New Castle, Delaware is described. The system was designed for a 40 percent heating and a 30 percent hot water solar contribution serving the heat loads in the following order: space heat - new addition, domestic water - entire facility, and pool heating - entire facility. On a cost basis for 2920 hours of operation, the heat reclaimed would cost $969.66 annually if provided by gas at 3.79 per million Btu's. At 5.5 centers per kwh, heat recovery costs of $481.80 percent a net savings of $487.86 annually.

N80-31880/1 PC **A06**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Performance Evaluation. Seasonal Report for Wormser, Columbia, South Carolina.
Contractor Report, Jun. 1979 - May 1980.
Aug 80, 110p NASA-CR-161546
Contract NAS8-32036
Sponsored in Part by DOE.

The Wormser Solar Energy System's operational performance from April 1979 through March 1980 was evaluated. The space heating subsystem met 42 percent of the measured space heating load and the hot water subsystem met 23 percent of the measured hot water demand. Net electrical energy savings were 4.36 million Btu's or 1277 kwh. Fossil energy savings will increase considerably if the uncontrolled solar energy input to the building is considered.

N80-31883/5 PC **A05**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Performance Evaluation: Seasonal Report for Colt Yosemite, Yosemite National Park, California.
Progress Report, May 1979 - Apr. 1980.
Aug 80, 88p NASA-CR-161539
Contract NAS8-32036
Prepared for DOE.

The system's operational performance from May 1979 through April 1980 is described. Solar energy satisfied 23 percent of the total performance load, which was significantly below the design value of 56 percent. A fossil savings of 80.89 million Btu's or 578 gallons of fuel oil is estimated. If uncontrolled losses could have been reduced to an inconsequential level, the system's efficiency would have been improved considerably.

N80-31894/2 PC **A06**/MF **A01**
Technical Univ. of Denmark, Lyngby.
Solar Energy Applications for Dwelling; Modelling and Simulation Part.
Final Report.
O. Joergensen. 1980, 109p EUR-6681/I-EN

Methods developed within the EC countries are presented and compared. The methods were used to predict the performance of three different solar heating systems: a domestic hot water system, a pure house heating system, and a combined system. Three different sets of weather data were used: Carpentras, Hamburg, and Ireland. The comparisons were undertaken on three different timebases: yearly, monthly, and hourly. A sensitivity analysis was formed on different parameters by different programs.

N80-31914/8 PC **A06**/MF **A01**
Technische Hogeschool, Delft (Netherlands).
Absorption Refrigeration Machine Driven by Solar Heat.
Final Report.
C. Keizer, and S. H. Liem. 1980, 101p EUR-6748-EN

A mathematical model of a single and a two stage solar absorption regrigeration system is developed in which data of collectors and weather data can be implicated. The influence of the generator, the absorber efficiencies, and the cooling temperature on the coefficient of performance (COP) of a singe and two stage absorption refrigeration process are investigated. For low generator temperatures the absorber efficiency has more influence on COP than the generator efficiency. Only spectral selective double window and high performance collectors can be used for air cooled solar absorption refrigeration systems at an evaporator temperature of -5 C. It is concluded that a water cooled solar absorption refrigeration system in combination with a solar tapwater installation for household use can be achieved with 6 to 8 square meters high performance collector area.

PB81-106981 PC **A16**/MF **A01**
National Inst. of Building Sciences, Washington, DC.
Residential Energy Efficiency Standards Study. Technical Analysis.
Jun 80, 370p HUD-0001671
Contract HUD-HC-5040

This report determines the need for, the feasibility of, and the problems of requiring, by mandatory Federal action, that all residential dwelling units meet applicable energy efficiency standards. The analysis identified the potential requirements of mandatory energy efficiency standards, estimated the incremental energy savings and investment cost of mandatory standards for 1981 through 1990, and assessed the impact of the estimated, maximum incremental energy savings and investment cost of standards on the entire economy.

SERI/TR-0924-8 PC **A03**/MF **A01**
Bickle/CM, Inc., Albuquerque, NM.
Performance Data for Passive Systems. The Charless Fowlkes House.
Jun 80, 38p
Contract AC02-77CH00178

The Fowlkes House, utilizing a water tube storage wall, has been constructed in Bozeman, Montana and was monitored by the owner, Dr. Charless W. Fowlkes. This data and experience has been used to assess the performance of such systems during actual occupancy conditions. The information obtained has proven extremely useful in determining design parameters within the Montana area. In a period lasting from 1976 to 1977, Dr. Fowlkes designed and built this indirect gain passive solar home. The house, passive solar system, data acquisition system, and performance data are described. (ERA citation 05:032013)

13B. Civil Engineering

AD-A089 159/8 PC **A09**/MF **A01**
Wisconsin Univ-Madison
Upper Mississippi II Dredged Material Disposal Site Recreational User Assessment.
Final draft rept.,
R. H. Becker, W. A. Gates, and B. J. Niemann.
Feb 80, 187p
Contract DACW25-79-C-0008

As part of its long-term statutory mission the U.S. Corps of Engineers maintains a nine-foot navigation channel in the Mississippi River by a system of locks and dams supplemented by maintenance dredging. Largely sand, the dredged material has been placed in the flowages each year to create dredge spoil sites, which appear as islands or sand bars. This report on recreational use of these artificial islands or sites is one phase of an overall study of the Mississippi River underway by the Great River Environmental Action Team (GREAT). Major agencies participating in this interdisciplinary study group are the U. S. Army Corps of Engineers, U.S. Fish and Wildlife Service, USDA Soil Conservation Service, U.S. Geological Survey, as well as state conservation commissions, state historical societies, state departments of natural resources, and state departments of transportation. A major concern of the GREAT study is to develop a plan to resolve any problems (environmental or otherwise) of the dredge materials disposal. GREAT work groups are exploring uses and places where the dredged materials can be an asset, means to minimize sedimentation, and acceptance of disposal sites for recreational use.

AD-A089 307/3 PC **A16**/MF **A01**
Army Engineer District Fort Worth TX
Final Environmental Statement and Supplemental Information for Aquilla Lake, Aquilla Creek, Hill County, Texas.
Final rept.
13 Apr 76, 355p

Engineering and economic review of the project resulted in the conclusion that the Aquilla Creek Watershed's water resources will be needed by the year 2020 to make up out-of-basin and downstream deficiencies and would be more economically feasible if it were designed and constructed to develop 9.7 million gallons per day. This supplement has been prepared to reevaluate the new or additional environmental elements impacted by the larger current project as a result of the increase in the size of the lake. (Author)

AD-A089 366/9 PC **A02**/MF **A01**
Southeastern Center for Electrical Engineering Education Inc St Cloud FL
Improved Methods for Large Scale Structural Synthesis.
Final rept.,
M. Pappas. 21 Sep 79, 25p AFOSR-TR-80-0921
Contract F49620-79-C-0038
Prepared in cooperation with New Jersey Inst. of Tech., Newark. Dept. of Mechanical Engineering.

This report describes two potential improvements in techniques for large scale structural synthesis. One involves a method for control of oscillation found to occur in many optimization procedures. The other is a new primal mathematical programming algorithm. The central idea for oscillation control is the use of the gradients of a potentially active constraint set to prevent serious violation of one of the set when a move is made considering only the active constraints. The mathematical programming procedure uses an improved feasible direction finding formulation. Results of numerical experiments using these methods on two classical ten bar truss examples are very encouraging. Serious oscillations found to occur in some optimality criteria procedures were eliminated in all cases tested. The mathematical programming method was found to be comparable in effectiveness to the optimality criteria procedures on these problems. Further research is required to refine these methods and substantiate the initial successes. (Author)

AD-A089 389/1 PC **A02**/MF **A01**
Pennsylvania State Univ State College. Applied Research Lab
Particulate Distributions in the Garfield Thomas 48-Inch Diameter Water Tunnel.
Technical memo.,
G. C. Lauchle, and J. B. Crust. 28 Jul 80, 19p
Rept no. ARL/PSU/TM-80-162
Contract N00024-79-C-6043

A series of water samples were collected from the test section of the Garfield Thomas 48-inch diameter water tunnel and analyzed for particulate shape, size, and elemental composition. These collections took place over a two week period of time and over a range of test section flow conditions. The analyses have shown that the standard deviation of the particulate average diameter is 2.1 microns, that they are typically non-spherical in shape with an average fineness ratio of 0.65, and that the major elements are aluminum and silicon with minor and trace elements consisting of chlorine, calcium, iron, nickel and zinc. (author)

AD-A089 460/0 MF **A01**
Urban Research and Development Corp Bethlehem PA
Recreation Carrying Capacity Facts and Considerations. Report 1. Barkley Lock and Dam, Lake Barkley Project Area.
Miscellaneous paper.
Jul 80, 98p WES-MP-R-80-1-1
Contract DACW39-78-C-0096
Report on the Recreation Research Program. Original contains color plates: All DTIC and NTIS reproductions will be in black and white. See also Report 2, AD-A089 572.
Availability: Microfiche copies only.

This report provides selected recreation carrying capacity-related information for the Lake Barkley

Project. The information is based upon: (1) user and management surveys conducted at Lake Barkley, and Urban Research and Development Corporation's observations and perceptions of the situations at the project's activity areas. The report provides information regarding activity situations, user characteristics, carrying capacity findings, and other findings; it then focuses on selected problem situations and their possible solutions. (Author)

AD-A089 572/2 PC **A06**/MF **A01**
Urban Research and Development Corp Bethlehem PA
Recreation Carrying Capacity Facts and Considerations. Report 2. Benbrook Lake Project Area.
Miscellaneous paper.
Jul 80, 115p WES-MP-R-80-1-2
Contract DACW39-78-C0096.
Report on the Recreation Research Program. Original contains color plates: All DTIC and NTIS reproductions will be in black and white. Includes envelope with map. See also Report 1, AD-A089 460.

This report provides selected recreation carrying capacity-related information for the Benbrook Lake Project. The information is based upon: 1) user and management surveys conducted at Benbrook Lake, and Urban Research and Development Corporation's observations and perceptions of the situations at the project's activity areas. The report provides information regarding activity situations, user characteristics, carrying capacity findings, and other findings; it then focuses on selected problem situations and their possible solutions. (Author)

AD-A089 603/5 PC **A09**/MF **A01**
Coastal Engineering Research Center Fort Belvoir VA
Two-Dimensional Tests of Wave Transmission and Reflection Characteristics of Laboratory Breakwaters.
Technical rept.,
William N. Seelig. Jun 80, 189p Rept no. CERC-TR-80-1

Monochromatic and irregular wave transmission and reflection measurements were made for various subaerial and submerged breakwater cross sections. These two-dimensional laboratory tests included smooth impermeable breakwaters, rubble-mound breakwaters, and breakwaters armored with dolos unit. Wave transmission by overtopping was found to be related to breakwater freeboard wave runup, and breakwater crest width; a method of estimating transmission by overtopping coefficients is presented. The Madsen and White (1976) numerical procedure was found to be an important tool for predicting the amount of transmission through permeable breakwaters. Suggested procedures for estimating transmission coefficients have been incorporated into the computer programs OVER and MADSEN (included as appendixes) and these programs may be used to predict wave transmission coefficients for nonbreaking, breaking, monochromatic, and irregular wave conditions. (Author)

AD-A089 630/8 PC **A06**/MF **A01**
Urban Research and Development Corp Bethlehem PA
Recreation Carrying Capacity Facts and Considerations. Report 3. Hartwell Lake Project Area.
Miscellaneous paper.
Jul 80, 109p WES-MP-R-80-1-3
Contract DACW39-78-C-0096
See also Report 9, AD-A089 849. Includes envelope containing map. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

This report provides selected recreation carrying capacity-related information for the Hartwell Lake Project. The information is based upon: (1) user and management surveys conducted at Hartwell Lake, and Urban Research and Development Corporation's observations and perceptions of the situations at the project's activity areas. The report provides information regarding activity situations, user characteristics, carrying capacity findings, and other findings; it then focuses on selected problem situations and their possible solutions. (Author)

AD-A089 657/1 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Drop Formation and Evaporation of JP-4 Fuel Jettisoned from Aircraft,
R. Earl Good, and Harvey J. Clewell, III. 6 Dec 78, 10p Rept no. AFGL-TR-80-0248
Pub. in Jnl. of Aircraft, v17 n7 p450-456 Jul 80. Presented at the Aerospace Sciences Meeting (17th) held in New Orleans, LA., 15-17 Jan 79, Paper no. AIAA-79-0186R.

No abstract available.

NUREG-0686 PC **A12**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Primary Cooling System Chemical Decontamination at Dresden Nuclear Power Station, Unit No. 1, Docket No. 50-10, Commonwealth Edison Company.
Final environmental statement.
Oct 80, 258p

The staff has considered the environmental impact and economic costs of the proposed primary cooling system chemical decontamination at Dresden Nuclear Power Station, Unit 1 located in Grundy County, Illinois. The statement focuses on the occupational radiation exposure associated with the proposed Unit 1 decontamination program, on alternatives to chemical decontamination, and on the environmental impact of the disposal of the solid radioactive waste generated by this decontamination. The staff has concluded that the proposed decontamination will not significantly affect the quality of the human environment. Furthermore, any impacts from the decontamination program are outweighed by its benefits.

N80-31667/2 PC **A06**/MF **A01**
Northern Research and Engineering Corp., Woburn, MA.
Us Coast Guard Lightweight Fire-Fighting Module.
Final Report.
15 May 80, 117p NASA-CR-161552, NREC-1296-1
Contract NAS8-31977

The U.S. Coast Guard Fire-fighting Module developed for the purpose of fighting fires in harbors and on ships is described. The module can be lifted by a dockside crane or helicopter and placed on the deck of a patrol boat or cutter for transportation to the scene of the fire. At the fire the module can be set up and put in operation by a crew of two in approximately fifteen minutes. Once in operation the module will deliver water to two fire nozzles at a pressure of 150 psi and a flow rate of 2000 gpm. Sufficient fuel is carried in the module for three hours of continuous operation. A record of the development of the fire fighting module is also presented.

N80-31672/2 PC **A02**/MF**A01**E
National Aerospace Lab., Amsterdam (Netherlands). Flight Dynamics Div.
Investigation of the Vibrational Behavior of a Cable-Stayed Bridge under Wind Loads.
J. W. G. Vannunen, and A. J. Persoon. 12 Feb 79, 15p NLR-MP-79004-U
Presented at Intern. Conf. On Environ. Forces on Eng. Struct., London, 3-6 Jul. 1977.

Wind tunnel tests were carried out on a two dimensional model to establish the flutter stability of the bridge and to determine resonance vibrations due to vortex shedding. During construction of the actual bridge, vibration measurements were performed and the wind-induced vibrational behavior of the structure was observed. Measured resonance vibration agreed very well with the values for the model tests in the tunnel.

N80-31995/7 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Atmospheric Particulate Analysis Using Angular Light Scattering.
M. Z. Hansen. 1980, 40p NASA-TM-81112
Submitted for Publication.

Using the light scattering matrix elements measured by a polar nephelometer, a procedure for estimating the characteristics of atmospheric particulates was developed. A theoretical library data set of scattering matrices derived from Mie theory was tabulated for a range of values of the size parameter and refractive index typical of atmospheric particles. Integration over the size parameter yielded the scattering matrix elements for a variety of hypothesized particulate size distributions. A least squares curve fitting technique was used to find a best fit from the library data for the experimental measurements. This was used as a first guess for a nonlinear iterative inversion of the size distributions. A real index of 1.50 and an imaginary index of -0.005 are representative of the smoothed inversion results for the near ground level atmospheric aerosol in Tucson.

PB81-100166 PC **A02**/MF **A01**
Hamburg (John) and Associates, Inc., Rockville, MD.
Estimation of an Origin-Destination Trip Table Based on Observed Link Volumes and Turning Movements. Executive Summary.
Final rept.,
Y. J. Gur. Jul 80, 11p FHWA/RD-80/037
Contract DOT-FH-11-9292
See also Volume 1, PB81-100174.
Also available in set of 4 reports PC E16, PB81-100158.

The objective of the project was to develop a model for estimating an Origin Destination (OD) trip table for highway traffic in small areas based primarily on observed link volumes and turning movements. The major use of the trip table would be as an input to traffic assignment and simulation models for estimation of network flows and performance. The model developed in the project, the LINKOD model, has achieved its stated objective. This represents a significant advance in traffic modelling. Major features include: (1) an existing trip distribution model which has been enhanced to account for the unique attributes of small area OD movements; (2) a technique for correcting an input trip table, so it best reflects observed link volumes, has been implemented. This technique is based on the theory of equilibrium traffic assignment; and (3) the model is driven by a software package which permits efficient applications.

PB81-100174 PC **A06**/MF **A01**
Hamburg (John) and Associates, Inc., Rockville, MD.
Estimation of an Origin-Destination Trip Table Based on Observed Link Volumes and Turning Movements. Volume 1: Technical Report.
Final rept. Jun 77-Aug 79,
Y. J. Gur, M. Turnquist, M. Schneider, L. Leblanc, and D. Kurth. May 80, 119p FHWA/RD-80/034
Contract DOT-FH-11-9292
See also Volume 2, PB81-100182. Prepared in cooperation with the Urban Systems, Inc., Chicago, IL.
Also available in set of 4 reports PC E16, PB81-100158.

The LINKOD modelling system estimates a trip table based on observed link volumes and turning movements. This trip table can be used as an input to traffic assignment and/or simulation models. LINKOD is designed for small area analysis where all link volumes are known. The system is driven by the models: SMALD, a trip distribution model for small areas, and ODLINK, an adaptable trip table assignment model. SMALD estimates a trip table (the Target table) based on trip rates at sources and sinks, and the network's service level. The ODLINK model corrects an input (Target) trip tables, so it best replicates the observed flows, when assigned using equilibrium assignment. The models are driven by the LINKOD software package. The package includes several computer programs which perform input data editing and extensive summaries of the results.

PB81-100182 PC **A09**/MF **A01**
Hamburg (John) and Associates, Inc., Rockville, MD.
Estimation of an Origin-Destination Trip Table Based on Observed Link Volumes and Turning Movements. Volume 2: User's Manual.
Final rept. Jun 77-Aug 79,

Y. J. Gur, P. Hutsebaut, D. Kurth, M. Clark, and J. Castilia. May 80, 187p FHWA/RD-80/035
Contract DOT-FH-11-9292
See also Volume 1, PB81-100174 and Volume 3, PB81-100190. Prepared in cooperation with the Urban Systems, Inc., Chicago, IL.
Also available in set of 4 reports PC E16, PB81-100158.

This manual gives the necessary information on use of the LINKOD software package and interpretation of its results. The structure of the manual has been dictated by the structure of the package, as LINKOD consists of a number of essentially independent but interrelated computer programs. Accordingly, parts of the document describe the system as a whole, while other parts describe the individual programs.

PB81-100190 PC **A06**/MF **A01**
Hamburg (John) and Associates, Inc., Rockville, MD.
Estimation of an Origin-Destination Trip Table Based on Observed Link Volumes and Turning Movements. Volume 3: Program Manual.
Final rept. Jun 77-Aug 79,
Y. J. Gur, P. Hutsebaut, D. Kurth, and M. Clark. May 80, 115p FHWA/RD-80/036
Contract DOT-FH-11-9292
See also Volume 2, PB81-100182. Prepared in cooperation with the Urban Systems, Inc., Chicago, IL.
Also available in set of 4 reports PC E16, PB81-100158.

This manual describes the way the software operates. It is intended to aid in maintenance and enhancements. Before attempting to use the manual, the reader is encouraged to get familiar with the Users Manual, in particular Parts II and IV. The manual has been written for readers with a good working knowledge of FORTRAN. The manual describes each program independently. The description starts with showing the structure of the program as a whole, followed by a short write up for each routine. For detailed study of individual routines, the user is encouraged to refer to the in-code documentation, which includes variable tables and a detailed explanation of the operation.

PB81-101974 PC **A09**/MF **A01**
Governors State Univ., Park Forest South, IL. Coll. of Environmental and Applied Science.
An Experimental Study of Lake Loading by Aerosol Transport and Dry Deposition in the Southern Lake Michigan Basin.
Final rept. 1 Jun 76-31 Jul 79,
Herman Sievering, Mehul Dave, Donald A. Dolske, Richard L. Hughes, and Patric McCoy. Jul 79, 197p EPA-905/4-79-016
Grant EPA-R-005301-01
Prepared in cooperation with Natinal Center for Atmospheric Research, Boulder, CO. Research Aircraft Facility.

A Lake Michigan experimental program to assess the contribution to Great Lakes loading by atmospheric transport and dry deposition of aerosol was conducted. A midlake and nearshore trace element and nutrients data base with associated meteorology capable of establishing a climatology for mass transfer to Lake Michigan was collected during 1977 and 1978. Significant data for Al, Ca, Cu, Fe, Mg, Mn, Pb, Ti, Zn, total P, NO3 and SO4 were obtained. A strong linear dependence upon atmospheric thermal stability in the variability of all twelve aerosol constituents was found, but no linear dependence upon wind speed was found. Bulk deposition velocities as a function of overlake climatology were used to calculate dry deposition atmospheric loadings to Lake Michigan.

PB81-102493 PC **A03**/MF **A01**
National Oceanic and Atmospheric Administration, Silver Spring, MD. Air Resources Labs.
User's Guide for ATCOOL Cooling Tower Plume Model.
Technical memo.,
Steven R. Hanna. Jun 80, 31p NOAA-TM-ERL-ARL-85, NOAA-80082604

ATCOOL is a computer program for calculating the variation of cooling tower plume parameters with height and distance downwind. It combines Briggs' plume rise model with Weinstein's cloud physics model. Plume rise, visible plume length, and cloud formation can be calculated. The program listing and a worked example are given.

PB81-103210 PC **A03**/MF **A01**
Transportation Research Board, Washington, DC.
Traffic Accident Analysis and Application of Systems Safety,
David L. Renshaw, Everett C. Carter, S. Khasnabis, Ali Atabak, and Ronald W. Eck. 1980, 39p TRB/TRR-753, ISBN-0-309-03063-3
Also pub. as ISSN-0361-1981. Library of Congress catalog card no. 80-22196.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

Contents:
- Identification of high-hazard locations in the Baltimore County road-rating project;
- Comparison of accident data for trucks and for all other motorized vehicles in Michigan;
- Truck drivers' perceptions of mountain driving problems;
- Development of a master file of essential highway-safety planning and evaluation data;
- Traffic accidents--day versus night.

PB81-103426 PC **A02**/MF **A01**
Texas Transportation Inst., College Station.
Cost Effectiveness of Small Highway Sign Supports - A Summary Report.
Final rept. Jul 75-Sep 79,
Hayes E. Ross, Jr. May 80, 20p 3254-5F, FHWA/RD-80/501
Contract DOT-FH-11-8821

The basic purpose of the study was to develop objective criteria and methodologies to assist the engineer in the selection of a cost-effective sign support system. To accomplish this objective, four tasks were required. These were (1) survey existing practices, (2) evaluate the crashworthiness of widely used support systems and promising new systems, (3) develop methodologies whereby candidate systems could be evaluated on a cost-effective basis, and (4) to the extent possible, identify the relative cost-effectiveness of current systems. Additional tasks dealt with the impact behavior of rural mailboxes, crash test evaluation of selected small sign supports using subcompact automobiles, and static load tests of a signpost in soil. Results of the study are presented in seven technical reports. A narrated, documentary 16mm movie presenting a summary of the study was also developed.

PB81-103434 PC **A04**/MF **A01**
Texas Transportation Inst., College Station.
Crash Tests of Single Post Sign Installations Using Subcompact Automobiles.
Interim rept. Jul 75-Sep 79,
Hayes E. Ross, Jr., and Kenneth C. Walker. May 80, 59p 3254-7, FHWA/RD-80/503
Contract DOT-FH-11-8821

Three full-scale crash tests were conducted to evaluate impact behavior of a subcompact vehicle following impact with widely used signpost designs. Each test vehicle weighed 1940 lb (863 kg) and impact speed was approximately 60 mph (96.5 km/h) in each test. Two tests involved impact with a 3 lb/ft (4.5 kg/m) steel U-post and the other test involved 3 lb/ft (4.5 kg/m) steel U-posts bolted together to form a 6 lb/ft (8.9 kg/m) back-to-back section. Impact with the 3 lb/ft post in a dry soil resulted in a vehicle change in velocity above the limiting value. Impact with the same post in a wet soil resulted in an acceptable vehicle velocity change since the post was pulled out of the ground. Impact with the 6 lb/ft post resulted in a vehicle change in velocity that greatly exceeded the limiting value. After impact the vehicle rolled over and was a total loss.

PB81-103442 PC **A06**/MF **A01**
Texas Transportation Inst., College Station.
Crash Tests of Rural Mailbox Installations.
Interim rept. Jul 75-Jan 79,
Hayes E. Ross, Jr., and Kenneth C. Walker. May 80, 111p 3254-6, FHWA/RD-80/504
Contract DOT-FH-11-8821

Five full-scale crash tests were conducted to evaluate the impact behavior of rural mailbox installations. Three of the five tests involved commonly used wood post supports, two of which were single box installations and the third was a four-box installation. The other two tests involved two promising new support concepts which utilized standard steel pipe. Both tests involved single box installations. Results showed that installations with multiple boxes mounted on boards pose a serious hazard to motorists since the board can easily penetrate the windshield. The results also showed that a pipe support post performs in a more desirable manner than does a wood post. Careful attention must be given to the box-to-post attachment to prevent separation during impact and thus minimize the potential for windshield penetration by the mailbox.

PB81-103772 PC **A03**/MF **A01**
National Environmental Engineering Research Inst., Nagpur (India).
Sanitation Facilities for Slums and Rural Areas,
V. Raman. Dec 75, 28p

Urban slums and rural areas present a dismal picture in respect of environmental sanitation. NEERI is seized with this problem and engaged in devising ways and means to ameliorate the situation. The means to achieve this have got to be necessarily simple, easy to operate and well within the reach of a household. This brochure presents typical designs of sanitation facilities. It is hoped that the brochure will serve as a guide to Government Departments, local bodies and individuals for successful implementation of the sanitation program. Even though such schemes might not be remunerative on their value, the improved living conditions will indirectly reflect on increased productivity. Moreover, such a program forms a social responsibility to communities.

PB81-103814 PC **A07**/MF **A01**
Institute for Local Self-Reliance, Inc., Washington, DC. Waste Utilization Div.
National Recycling Research Agenda Project for the National Science Foundation, San Francisco, California and Washington, DC.
Final rept. Nov-Dec 79,
N. N. Seldman. Mar 80, 128p NSF/RA-8000137
Grant NSF-OPA79-17013

The project was convened in order to address the requirements of a Federal R and D investment program which would encourage a diversified approach to a wide array of material and energy recovery technologies, allowing local governments, private enterprise, and citizens to reap the full potential from its solid waste management institutions. Over 150 individuals who responded to the announcements were asked to provide resumes and to address nine problem areas relating to resource recovery technology development. They are as follows: markets for secondary materials; compatibility of recycling (materials recovery) and combustion (energy recovery); technology and equipment development; project initiation; waste (source) reduction; participation; institutional barriers; hazardous waste; and waste utilization.

PB81-103897 PC **A02**/MF **A01**
California Univ., Irvine. Inst. of Transportation Studies.
Shared Ride Taxi Services as Community Public Transit. Executive Summary.
Final rept. 1 Sep 78-31 Jan 80,
Roger F. Teal, Gordon J. Fielding, Genevieve Giuliano, James V. Marks, and Richard E. Goodhue. Mar 80, 15p UMTA-CA-11-0017-80-1
See also PB80-226475.

The report examines the use of taxi firms as the providers of publicly supported demand responsive transit (DRT). The use of taxi firms as DRT providers raises a number of important institutional and performance issues. Accordingly, the primary purposes of this study are to: (1) analyze the issues associated with taxi firm provision of publicly sponsored community transit service, including the institutional reasons for contracting, competition for contracts, and contractual arrangements and their effects; and (2) evaluate the performance of taxi-based community transit systems and the consequences for taxi firms becoming public transit providers, including legal implications, oper-

ational changes, labor-management relations, impact of subsidization, and effects of contracting on the firm's financial situation and future plans. Shared ride taxi (SRT) performance is evaluated in terms of cost-efficiency and effectiveness, and is also compared to that achieved by other forms of community level transit. These subsidized SRT systems have become the predominant form of general public DRT in California, with 29 such systems now in operation. Based on California's experiences with subsidized SRT, this study presents case reviews of SRT implementation and operation, analyzes the issues associated with the development of taxi-based transit services, and evaluates the performance of subsidized SRT.

PB81-103921 PC **A07**/MF **A01**
Ultrasystems, Inc., Irvine, CA.
Handbook on Components for Safety Rest Areas.
Rept. for Jul 74-Jun 76,
John T. Anderson. Jun 76, 129p FHWA-RD-76-63
Contract DOT-FH-11-8518

Information on the functionality of components in typical safety rest areas on Federal-aid highways of the Interstate, Primary, and Secondary Systems is provided for nine convenience components (i.e., picnic tables, shelters, trash receptacles, drinking fountains, etc.) and on nine comfort components (partitions, walls and floors, toilets, wash basins, hand dryers, etc.). Ranges of typical operating and maintenance costs of safety rest areas which have modern comfort stations are also included. The handbook is intended to expand the data available to highway department personnel faced with choosing one type of component from several alternatives. It is not intended to restrict design alternatives but to provide additional insight into the problem many states have experienced with different types of components in their safety rest areas and any solutions that have been developed.

PB81-104176 PC **A08**/MF **A01**
Municipal Environmental Research Lab., Cincinnati, OH. Wastewater Research Div.
EXEC/OP Reference Manual, Version 1.2.
Rept. for Feb-Mar 80,
Lewis A. Rossman. Jun 80, 166p EPA-600/2-80-182, EPA/DF-80/009A
For system on magnetic tape, see PB81-104168. See also PB80-174220.

The original version of EXEC/OP, a Fortran computer program that synthesizes municipal wastewater treatment system designs from a specified list of unit treatment processes, has been updated. Revisions have been made in several of the unit process performance sub-models to produce results that conform more closely to accepted design practices. This new reference manual describes the elements of the EXEC/OP program, gives instructions on how to prepare input data for the program, and illustrates its application to a sample design problem. Also included is a listing of the updated Fortran source code and definitions of the program's variables. A computer tape of the Fortran source code is available through NTIS.

PB81-104655 PC **A03**/MF **A01**
California State Dept. of Transportation, Sacramento.
Safety Guidelines for Wheelchair Lifts on Public Transit Vehicles.
Final rept. Jan 77-Aug 79,
Carl F. Stewart, and Herbert G. Rei1l. Jul 80, 27p UMTA-CA-06-0098-80-1
Grant DOT-UMTA-CA-06-0098

The Safety Guidelines for Wheelchair Lifts on Public Transit Vehicles were developed through a grant from the Office of Technology Development and Deployment of the Urban Mass Transportation Administration to the Division of Mass Transportation of the California Department of Transportation (CALTRANS). CALTRANS was supported in this research by a broadly based advisory panel of persons drawn from industries and other sectors engaged in activities pertinent to the public transport of the handicapped. The panel is listed within this report. In addition, CALTRANS asked bus and lift manufacturers and many transit operators to comment on draft safety Guidelines. Advice was also sought from the staff of the Urban Mass Transportation Administration, the National Highway Traffic Safety Administration, and the Transportation Systems Center. This report furnishes guidelines that can be used in addressing safety in the preparation of specifications for wheelchair lifts to be used on public transit buses and vans, and are written in performance specification language.

PB81-104796 PC **A05**/MF **A01**
Austin, TX.
Porous Pavement. Phase I. Design and Operational Criteria.
Final rept. 1 Feb-1 Aug 79,
Elvidio V. Diniz. Aug 80, 100p EPA-600/2-80-135
Grant EPA-R-806338
Prepared by Espey, Huston and Associates, Inc., Albuquerque, NM.

Design and operational criteria, utilization concepts, benefits and disadvantages, as well as other characteristics of porous pavements are presented in this report. Particular emphasis is placed on porous asphalt pavements, but the criteria and design approach are applicable to all other porous pavement types. The design considerations presented in this report include siting problems, load bearing design, and hydrologic design. A brief history of porous pavement development and previous experience with porous pavement by several designers, contractors, and operators are described. A computer model for hydrologic performance evaluation of existing or proposed porous pavement systems is also described in this report. Load bearing design criteria are based on previous work conducted for porous asphalt pavements. Appendices to this report include a sample set of specifications for porous asphalt construction and a list of soils and their permeability classes as prepared by the U.S. Soil Conservation Service.

PB81-104960 PC **A06**/MF **A01**
Purdue Univ., Lafayette, IN. Joint Highway Research Project.
Development and Use of a Computer Simulation Model for the Evaluation of Design and Control Alternatives for Intersections of Minor Roads with Multi-Lane Rural Highways: Field Studies and Model Validation.
Interim rept.,
A. E. Radwan, K. C. Sinha, and H. L. Michael. 11 Jul 79, 117p JHRP-79-9, FHWA/ISHC/JHRP-79/9
Sponsored in part by Indiana State Highway Commission, Indianapolis.

This report presents the details of the field studies conducted at a group of intersections in Indiana to obtain the necessary data for the modification and subsequent validation of the computer simulation model. Appropriate field studies were conducted to estimate gap acceptance distribution of minor road drivers to cross or merge with major road traffic at stop controlled intersections. Additional field studies were performed at signalized and unsignalized intersections to investigate the correlation between traffic volume, traffic conflicts and accidents, and to determine the effectiveness of the traffic conflict technique as a measure of safety at intersections. The simulation package, developed under the auspices of the Federal Highway Administration, called UTCS-1 (known now as NETSIM) has been selected for use in this study. Several modification, however, were made to the computer model to incorporate the estimation of average delay per vehicle, fuel consumption per vehicle, and number of traffic conflicts. The results of the field studies were further used to substantiate the model's validity.

PB81-104986 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
The Concrete Pavement-Design Experiment on Trunk Road A1 at Alconbury Hill: Twenty Years' Performance,
J. R. Nowak. c1979, 34p TRRL-LR-887
Also pub. as ISSN-0305-1293.

The report describes the structural performance during the first twenty years of experimental concrete pavement laid during 1957 on the northbound carriageway of the London Edinburgh Trunk Road A1, at Alconbury Hill, Cambridgeshire. The length of 1500 meters comprises 35 experimental sections. The commercial traffic carried during the period of twenty years was 13.5 million standard axles. The object of the experiment is to investigate the effect of the following factors on the performance of a concrete road: thickness of concrete, strength of concrete, the amount of reinforcement and the type and thickness of sub-base. The main conclusions reached are that the thickness of the concrete slab is confirmed as the most critical factor affecting its performance, high-strength concrete continues to give significantly better results than normal concrete; lean-concrete sub-bases are more effective than granular sub-bases. Very heavy traffic can be catered for by appropriate seletion of slab thickness, type and thickness of sub-base; and strength of concrete. (Copyright (c) Crown Copyright 1979.)

PB81-105371 PC **A02**/MF **A01**
Naval Weapons Center, China Lake, CA.
Aerosol Generation to Simulate Specific Industrial Fine Particle Effluents.
Journal article, Jan 75-Apr 77,
J. W. Carroz, F. K. Odencrantz, W. G. Finnegan, and D. C. Drehmel. Feb 80, 10p EPA-600/J-89-071
Also pub. in American Industrial Hygiene Association Jnl. 41, p77-84 Feb 80.

The article describes techniques that were developed to generate large quantities of fine particle metal oxide aerosols, by burning flammable solutions containing appropriate soluble compounds (nitrates) of the desired elements. In the flame these compounds generally decomposed to oxides. The generated aerosol flow rates were as a high as 42 cu m/min (1500 cfm); mass concentrations were as high as 16.8 g/cu m at STP. For most aerosols, particle concentrations were of the order of 10 to the 9th power part./cu m. Electron microscopic pictures (SEM and TEM) of precipitated particles show that many of the larger particles (20 micrometers) are hollow and that the smaller particles (0.01 micrometer) are aggregated. Specific aerosols were generated to simulate the fine particle effluents generated by combustion of pulverized coal (electricity generation), electric arc and basic oxygen furnaces (iron and steel production), and zinc smelters. Methods were developed to vary the SO2 concentration and the electrical resistivities of the simulants for coal combustion.

PB81-105587 PC **A04**/MF **A01**
TJKM, Walnut Creek, CA.
A Study of Clearance Intervals, Flashing Operation, and Left-Turn Phasing at Traffic Signals. Volume 1. Summary Report.
Final rept. Aug 75-May 78,
Barry Benioff, and Thayer Rorabaugh. May 80, 69p FHWA-RD-78-46
Contract DOT-FH-11-8783
See also Volume 2, PB81-105595. Prepared in cooperation with Mohle, Perry and Associates, Fullerton, CA.
Also available in set of 4 reports PC E17, PB81-105579.

This volume is a summary of three research studies on several aspects of traffic control to improve traffic operations and reduce accidents. The first study dealt with clearance intervals and more specifically with the effectiveness of a uniform yellow interval and all-red intervals. The second study addressed the question of whether traffic signals should be put on flashing operation during low volume periods. The third study considered signal phasing that allows vehicles to make left turns during both a protected (green arrow) interval and an unprotected (green) ball) interval. Each study used a literature review, a review of state laws, questionnaires to public officials and to drivers, analytical models of traffic flow, and field studies to arrive at the recommendations.

PB81-105595 PC **A08**/MF **A01**
TJKM, Walnut Creek, CA.
A Study of Clearance Intervals, Flashing Operation, and Left-Turn Phasing at Traffic Signals. Volume 2. Clearance Intervals.
Final rept. Aug 75-May 78,
Barry Benioff, Frederick C. Dock, and Cynthia Carson. May 80, 156p FHWA-RD-78-47
Contract DOT-FH-11-8783
See also Volume 1, PB81-105587 and Volume 3, PB81-105603.

Also available in set of 4 reports PC E17, PB81-105579.

This volume describes a study to develop recommendations for two questions regarding clearance intervals: (1) should a uniform yellow interval be used throughout a metropolitan area, and (2) when should all-red clearance intervals be used and how long should they be. The study procedures include a literature review, a review of state laws, questionnaires to public officials and to drivers, analytical models of traffic flow, and field studies. The uniform yellow was found not to be particularly beneficial.

PB81-105603 PC **A08**/MF **A01**
TJKM, Walnut Creek, CA.
A Study of Clearance Intervals, Flashing Operation, and Left-Turn Phasing at Traffic Signals. Volume 3. Flashing Operation.
Final rept. Aug 75-May 78,
Barry Benioff, Cynthia Carson, and Frederick C. Dock. May 80, 173p FHWA-RD-78-48
Contract DOT-FH-11-8783
See also Volume 2, PB81-105595 and Volume 4, PB81-105611.
Also available in set of 4 reports PC E17, PB81-105579.

This volume describes a study to develop recommendations for putting traffic signals on flashing operation during low volume periods. The study procedures includes a literature review, a review of state laws, questionnaires to public officials and to drivers, analytical models of traffic flow, and field studies of accidents, conflicts, violations, speed and delay. Flashing yellow/red operation was found to be desirable for only a limited number of traffic and signal conditions. Flashing red/red operation was not found to be a desirable form of low volume traffic control, but it might be used for emergency operation of traffic signals.

PB81-105611 PC **A05**/MF **A01**
TJKM, Walnut Creek, CA.
A Study of Clearance Intervals, Flashing Operation, and Left-Turn Phasing at Traffic Signals. Volume 4. Left-Turn Phasing.
Final rept. Aug 75-May 78,
R. Henry Mohle, and Thayer K. Rorabaugh. May 80, 99p FHWA-RD-78-49
Contract DOT-FH-11-8783
See also Volume 3, PB81-105603. Prepared in cooperation with Mohle, Perry and Associates, Fullerton, CA.
Also available in set of 4 reports PC E17, PB81-105579.

This volume describes a study to develop recommendations concerning the utilization of the protected/permissive left turn phasing technique. The study procedures included a literature review, a review of state laws, questionnaires to public officials and to drivers, and field studies. The protected/permissive left turn phasing technique was found to improve traffic movement efficiency and operations where left turn phasing is not needed at all times during the day. It was also determined that an increased level of public understanding of the meaning of left turn signal indications, the arrow versus the green ball, is needed before general recommendation for usage can be justified. Precautions in the use of the technique are also included.

PB81-105710 PC **A09**/MF **A01**
Arizona Univ., Tucson.
Institutional Framework for Environmental Assessment and Planning. A Final Report in a Series for the Lake Powell Research Project,
Helen Ingram, Eric Walther, Scott J. Ullery, and Hanna Cortner. Nov 77, 192p NSF/RA-770927
Grant NSF-ENV74-21232

The National Environmental Policy Act of 1970 (NEPA) was analyzed with respect to its impact on resource development of the Lake Powell region. Specifically, the study focused on NEPA as it has or has not modified the way in which environmental information is gathered, reviewed, communicated, and utilized in contemporary energy development--environment quality disputes. The central issue is how and whether NEPA has caused the electric power industry, the Department of the Interior, the Environmental Protection Agency, state governments, environmental groups, and Indians to relate to each other in a more sensitive way regarding environmental decisionmaking. The response of each of these groups to the opportunities and burdens of NEPA was examined.

PB81-105777 PC **A04**/MF **A01**
California Univ., Berkeley. Sanitary Engineering Research Lab.
Recreation Vehicle Waste Disposal in Roadside Rest Septic Tank Systems.
Interim rept. (Final) Jun 78-Jun 80,
Frank Pearson, David Jenkins, Hugh McLean, and Steven Klein. Jun 80, 65p UCB-SERL-80-1, FHWA/CA-80/01
Sponsored in part by California State Dept. of Transportation, Sacramento, and California State Water Resources Control Board, Sacramento.

Design criteria were developed for septic tank-leach field systems to treat high-strength waste that may contain toxic substances. High strength, toxic wastes are generated at recreation vehicle (RV) dump stations at roadside rest areas and recreational areas, where spetic tank systems are frequently used for waste treatment. Besides being much stronger than domestic sewage, RV wastes contain toxic preservatives added to the RV waste holding tanks for odor control. Preservatives inhibit degradation of sludge and scum in the septic tank, thereby increasing the net rate of sludge accumulation. Septic tank capacity must be increased over that required for the same flow of domestic waste, on account of the greater quantity of sludge generated from the high strength waste, compounded by the greater net rate of accumulation of sludge due to the toxicity of the waste. Engineering performance criteria were needed for septic tank-leach field systems treating preservative-laden waste. For this purpose, pilot units treating domestic sewage spiked with various concentrations of formaldehyde were monitored.

PB81-105900 PC **A02**/MF **A01**
Southern Research Inst., Birmingham, AL.
An Approach for Describing Electrical Characteristics of Precipitated Dust Layers.
Journal article,
Jack R. McDonald, Ronald B. Mosley, and Leslie E. Sparks. Apr 80, 7p EPA-600/J-80-070
Contract EPA-68-02-2193
Pub. in Jnl. of the Air Pollution Control Association, v30 n4 p372-376 Apr 80.

The paper proposes an approach for describing the electrical characteristics of electrostatically precipitated dust layers. It describes the macroscopic electrical properties of the dust layer, by couplinag the current transport equation and Poisson's Equation. It attributes the electrical breakdown of the dust layer to enhanced values of the local electric field due to the combined effects of polarization in the dielectric layer and the contribution to the electric field from the space charge distribution in the layer. Models based on this approach appear to offer the potential for describing the observed electrical behavior. It also discusses the experimental data which are needed for developing this approach.

PB81-106429 PC **A04**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Contra-Flow Bus Lanes: Economic Justification Using a Theoretical Model,
P. H. Bly, and F. V. Webster. c1979, 75p TRRL-LR-918

This report describes a theoretical study of the likely effects of installing a contra-flow bus lane in a one-way street system. The study, which is concerned only with the time and money components of a cost/benefit comparison, consisted of three distinct parts: the first was the formulation of a general economic framework in which benefits to buses and their passengers arising from the provision of a contra-flow lane in a street network were compared with the disbenefits to other traffic as a result of the presence of the lane and the costs of operating and implementing the scheme; from the results general warrants (i.e., minimum bus flows necessary to secure net overall benefits) were derived. The second part was a detailed theoretical study of a number of hypothetical situations representing four different road configurations with junctions controlled by signals, roundabout or channelization systems. A detailed examination of the changes in junction capacity and vehicular delays highlighted the problems which can arise when junctions, previously simplified on installation of one-way traffic regulatons, have some of the complexities reintroduced in order to accommodate the reserved lane. The case studies indicated the sensitivity of the warrants to the type of junction control in use and suggested that, in practice, for most situations it would be necessary to carry out a specific economic assessment. The third part of the study was therefore the formulaton of a standardized assessment methodology (based largely on the results of the other two parts of the study) for calculating the appropriate warrants and the economic benefits for any given scheme. This methodology, together with worked examples, is described in an appendix to this report. (Copyright (c) Crown Copyright 1979.)

PB81-106437 PC **A12**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Proceedings of the International Traffic Conflicts Technique Workshop (2nd) Held at Paris on May 10, 11 and 12, 1979,
S. J. Older, and J. Shippey. c1980, 251p TRRL-SUPPLEMENTARY-557

The purpose of the Second International Traffic Conflicts Technique Workshop was to up date and extend the valuable exchange of information on the use of the traffic conflicts technique which resulted from the First Workshop held in Oslo in September 1977. Apart from assembling information on the many developments made by the various research groups working with the technique more specific themes of the discussions were the identification of advantages and disadvantages of the different existing operational procedures. (Copyright (c) Crown Copyright 1980.)

PB81-106452 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Containment of Heavy Vehicles by Bridge Parapets of Post and Rail Type,
V. J. Jehu, and L. C. Pearson. c1979, 16p TRRL-LR-884

The containment capability of post and rail parapets depends, iter alia, on the post spacing. To provide quantitative data on this behavior, the increased containment obtained by having the post spacing has been measured in dynamic tests using 5 ton coaches impacting the parapet at 30 degrees. It was found that an aluminum P1 parapet with 3m post spacing did not contain a coach which struck it with the same severity as the P1 car impact. When the post spacing of the aluminum parapet was halved to 1.5m it withstood a 2 x P1 impact from a coach equivalent to the impact of a 20 ton vehicle at 58 km/h and 15 degrees. Having the post spacing of a steel P1 parapet from 3.66m to 1.83m increased its containment capability from 1.6 x P1 impact to 3.2 x P1 impact, a high level of containment equivalent to the impact of a 20 ton vehicle at 71 km/h and 15 degrees. (Copyright (c) Crown Copyright 1979.)

PB81-106627 PC **A04**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Evaluation of the TRRL High-Speed Profilometer,
P. B. Still, and P. G. Jordan. c1980, 53p TRRL-LR-922
Also pub. as ISSN-0305-1293.

A high-speed laser-based profilometer has been designed and developed at the Laboratory to measure surface profiles of roads and airfield runways. This report describes the theoretical and experimental studies carried out to identify and to evaluate the factors that influence the accuracy of measurement of the profilometer. Detailed comparisons between test profiles measured by survey techniques and by the profilometer are presented and discussed. (Copyright (c) Crown Copyright 1980.)

PB81-108078 PC **A10**/MF **A01**
Monsanto Research Corp., Dayton, OH.

Source Assessment: Dry Bottom Utility Boilers Firing Pulverized Bituminous Coal.
Final rept. May 74-Aug 80,
D. G. DeAngelis, R. B. Reznik, D. S. Ruffin, J. N. Rigano, and W. R. McCurley. Oct 80, 210p MRC-DA-997, EPA-600/2-80-042C
Contract EPA-68-02-1874

The report describes and assesses the potential impact of air emissions, wastewater effluents, and solid wastes from dry-bottom utility boilers firing pulverized bituminous coal. Consuming about 320 million metric tons of the coal per year, this is the primary method of firing coal in utility boilers. Air emissions were characterized from literature data, supplemented by field sampling. Significant emissions from coal combustion were particulate matter, SOx, NOx, hydrocarbons, polycyclic organic materials, and a number of elements emitted as particles and vapors. The potential environmental impact of each emission species (after passing through state-of-the-art controls) was individually assessed using a calculated quantity known as ambient source severity (the ratio of the maximum ground level concentration--determined through dispersion equations--to an ambient environmental goal). No species were found to have an ambient source severity greater than 1.0; NOx (0.97) and SOx (0.93) had the highest severities. It was estimated that the human population around an average source in this category exposed to an ambient severity greater than 0.05 was about 300,000 persons for NOx and SOx. Pollutant concentrations were also determined in wastewater and solid waste streams. Effluent source severities and solid waste discharges were both found to be minor, with controls.

PB81-108094 PC **A06**/MF **A01**
National Marine Fisheries Service, Charleston, SC. Charleston Lab.
Consumer Risk Simulation Model Users Guide.
Technical memo.
Jul 80, 123p NOAA-TM-NMFS-SEFC-18, NOAA-80090807

As part of its response to FDA's Federal Register Notice on mercury, National Marine Fisheries Service, in 1978, presented to that agency the results of a study using a computer simulation model which incorporated NMFS data on mercury levels in fish and shellfish with data on seafood consumption to estimate the intake of mercury by U.S. consumers of fishery products. It also permitted an evaluation of alternative action levels in assuring consumer safety. In 1979 work was initiated to generalize and streamline the model. This guide is a result of that work and describes in detail how the generalized version of the consumer-risk model works.

PB81-108458 PC **A05**/MF **A01**
West Virginia Univ., Morgantown. Div. of Forestry.
Use of Different Roadside Cover Plantings by Wildlife.
Final rept.,
Edwin D. Michael. Jun 80, 100p WVDOH-56, FHWA/WV-80/004

Use of 3 highway ROW cover crops: Crownvetch, (Coronilla varia) sericea lespedeza, (Lespedeza cuneata) and K-31 fescue, (Festuca sp.) were evaluated to determine use by various groups of wildlife. Data were collected on 3 groups of wildlife; small mammals, songbirds, and game animals. Mowed and unmowed sericea and fescue were examined to determine how mowing of ROW vegetation affects songbird use. Data were collected from October 1977 through July 1979 along I-79 and U.S. 48, in north-central West Virginia.

PB81-108466 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Bus-Actuated Traffic Signals-Initial Assessment of Part of the Swansea Bus Priority Scheme,
B. R. Cooper, R. A. Vincent, and K. Wood.
c1980, 29p TRRL-LR-925

Early in 1978 West Glamorgan County Council introduced a scheme for giving buses priority in Central Swansea. Using selective detection (SD) equipment, buses approaching traffic signals are detected separately from other vehicles and the signal operation may then be modified to reduce their delay. Part of the network was studied comprising a route passing through 6 intersections and one Pelican crossing, all equipped with SD facilities. Surveys were carried out with and without the priority in operation. Over the length of the route studied, buses equipped for gaining priority saved an average of nearly 40 seconds with some gains in regularity. Other vehicles lost an average of nearly 2 seconds each time they passed through a signal. Theoretical estimates suggest that pedestrians waited at signal-controlled crossing places for an extra 1 second with priority. Overall, priority saved bus occupants about 40 person-hours but lost other vehicle occupants and pedestrians about 90 person-hours over an average 10-hour day. About 60 per cent of the benefits and 80 percent of the disbenefits occurred at one double-junction where, since the survey, changes have been made to signal settings to limit the disbenefit to other traffic. There are also unquantified factors which tend to redress the balance. (Copyright (c) Crown Copyright 1980.)

PB81-108474 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Accuracy of Annual Traffic Flow Estimates from Automatic Counts,
Garwyn Phillips. c1979, 29p TRRL-SUPPLEMENTARY-515
Prepared in cooperation with Local Government Operation Research Unit.

Automatic traffic counters are used for on-going studies involving regular monitoring of traffic flows. The counters are rotated regularly among a number of sites throughout the year. Local authorities frequently use this sort of procedure to obtain estimates of annual flow on a network of roads. In this report, several methods of deriving these estimates are examined. Recommendations are given for the most appropriate counting schedules and a simple method of assessing the accuracy of the estimates is provided. (Copyright (c) Crown Copyright 1979.)

PB81-108508 PC **A04**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Water Program Operations.
A Guide to Regulations and Guidance for the Utilization and Disposal of Municipal Sewage Sludge.
Technical rept.
Sep 80, 58p EPA/MCD-72, EPA-430/9-80-015

This document provides a concise outline of the different Federal regulations and guidelines that pertain to each alternative for sludge utilization and disposal and points out how these regulations and guidelines should be addressed.

PB81-108532 PC **A02**
North Carolina Univ. at Chapel Hill.
Outfall Systems Can Achieve Safe Effluent Levels,
F. Y. Sorrell. Mar 80, 5p UNC-SG-R-153, NOAA-80090909
Pub. in Water and Wastes Engineering, p30-36 Mar 80. Prepared by North Carolina State Univ. at Raleigh.

An analysis of the internal diffuser flow shows that the desired effluent levels can be attained by modifying the layout of the outfall system. An outfall system disposes of contaminated fluids by mixing the effluent with the surrounding ambient water so the impact is acceptable and generally minimal. The outfall pipe transports the effluent to a discharge location that will permit good mixing. Mixing is also used in these situations due to the natural or existing eddy (turbulent) motion of the ambient water. A final consideration provides distance between the discharge location and regions that would be heavily impacted by the effluent. Jet momentum is also utilized the best by a series of small jets, instead of a single large jet.

PB81-108664 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Public Transport in Kingston, Jamaica and Its Relation to Low Income Households,
Margaret J. Heraty. c1980, 37p TRRL-SUPPLEMENTARY-546

The report is based on a study of public transport in Kingston, Jamaica, carried out with the cooperation of the Jamaican Government. It is one of a series of similar studies in developing countries carried out by TRRL. The results of local investigations into the organization and operation of the conventional bus undertaking and of the privately-operated minibuses are described and Jamaican Government survey data are used as a basis for analyzing the characteristics of the users of the two different services. An analysis of the attitudes of passengers, as elicited from this survey and from in-depth research with low income households, helps in formulating the ways in which both bus and minibus services may be improved. The role which public transport plays in the lifestyle of low income households is discussed with particular reference to expenditure on transport compared to other budget items. The Jamaican findings are compared with previous studies of the role of paratransit in two cities in South East Asia.

PB81-108672 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Ground Vibrations from Impact Pile Driving during Road Construction,
D. J. Martin. c1980, 31p TRRL-SUPPLEMENTARY-544

This report describes measurements at seven sites of ground vibrations generated by impact pile driving during road construction operations. Vibrations from driven steel case piling, driven and cast in-place displacement piling and linked sheet steel piling were monitored. Measurements were carried out to determine the relative magnitudes of the vibration components, the main frequency of the surface waves and the velocity levels of the ground vibration. Relations were established between the vertical velocity level and the distance between source and receiver for four sheet piling operations. Floor vibration levels in buildings adjacent to piling activities were measured, and the likely effects of impact pile driving was made using criteria proposed elsewhere for architectural damage and human disturbance. (Copyright (c) Crown Copyright 1980.)

PB81-108813 PC **A03**/MF **A01**
New Jersey Dept. of Transportation, Trenton. Div. of Research and Development.
Breakaway Cable Terminal Evaluation.
Final rept.,
Robert F. Baker. May 80, 50p 81-001-7799, FHWA/NJ-81/001

On the recommendation of the Federal Highway Administration the New Jersey Department of Transportation selected the 'Breakaway Cable Terminal' (BCT) for use as a guiderail end treatment in 1976. The selected design included 6 in. x 8 in. wood posts, an unstiffened buffer end, a bossed bearing plate and a one-piece anchor plate. The objective of this study was an evaluation of the in-service performance of BCTs. Thirteen impacts between vehicles and BCTs were evaluated for accident performance. The results of the in-service evaluation were compared with the fuel scale crash tests previously conducted by the Southwest Research Institute.

PB81-109100 PC **A04**/MF **A01**
Midwest Research Inst., Kansas City, MO.
Environmental Assessment of a Waste-to-Energy Process: GSA/Pentagon Co-Fired Boiler Tests.
Final rept.,
Mark A. Golembiewski. Oct 80, 58p EPA-600/7-80-170
Contract EPA-68-02-2166

Midwest Research Institute (MRI), in conjuction with the General Services Administration (GSA) and the National Center for Resource Recovery (NCRR), conducted a series of emission tests at the Virginia Heating and Refrigeration Plant (VHRP) in Arlington, Virginia (this plant provides steam heat or refrigerated air to the Pentagon building). The study was designed to obtain emission data while one of the steam boilers was co-fired with different blends of coal and densified refuse-derived fuel (d-RDF).

PB81-109183 PC **A15**/MF **A01**
SRI International, Menlo Park, CA.
Study of the Adequacy of Air Monitoring.
Final rept.,
Eugene Shelar, Jr., and Ronald E. Ruff. Sep 80, 350p AQ-7405-8D

The study evaluates the adequacy of air quality monitoring data and sampling procedures by assessing the content and implementation of EPA's May, 1979 air monitoring and quality assurance regulations. Interviews were conducted in five areas (Portland, Kansas City, New Orleans-Baton Rouge, Jacksonville, and Boston) with governmental, industry and public interest groups. The overall conclusion was that, given proper personnel and funding, the regulations will provide by 1983, a national monitoring system to satisfy the needs of future air quality planning and status attainment.

PB81-109258 PC **A09**/MF **A01**
New York City Transportation Administration. Office of the Administrator.
Manhattan Garment Center Urban Goods Movement Study. Phase I.
Final rept.
Jun 76, 179p UMTA-UPM-02-80-1
Contract DOT-OS-30053.
See also Appendix Volume 1, PB81-109266.
Also available in set of 5 reports PC E99, PB81-109241.

The City of New York, with the U.S. Department of Transportation and the U.S. Environmental Protection Agency, has embarked on the Manhattan Garment Center Urban Goods Movement Study in order to better understand the goods movement process, to develop techniques to alleviate the difficulties of urban goods movement, and to implement these techniques. This Garment Center study represents the first major effort to investigate the goods movement problems existing in a major, highly urbanized environment. The project is a comprehensive study of urban goods movement and is organized to meet several objectives: (1) to be accessible and responsive to the community; (2) to develop, design, evaluate, and implement short-term, low capital improvements for the goods movement system; and (3) to identify long-term solutions to goods movement difficulties. This report presents a summary of Phase I of the Manhattan Garment Center Urban Goods Movement Study. Phase I consists of the development of a data base, analysis of the goods movement problem, and the implementation of short-range proposals to improve the movement of goods and people. It addresses such issues as the economic structure of the garment industry; pattern of land use; volume and patterns of traffic and curbside parking; air and noise pollution levels associated with the garment industry; and the implementation of a program of short-range low capital improvements. This Phase I report states that the analyses, policy recommendations, and experiences of this project are appropriate for a study of urban goods movement in any area, particularly small metropolitan areas.

PB81-109266 PC **A08**/MF **A01**
New York City Transportation Administration. Office of the Administrator.
Manhattan Garment Center Urban Goods Movement Study. Phase I. Appendix Volume I.
Jun 76, 167p UMTA-UPM-02-80-2
Contract DOT-OS-30053
See also Phase 1, PB81-109258 and Appendix Volume 2, PB81-109274.
Also available in set of 5 reports PC E99, PB81-109241.

The Appendix Volume I, provides a detailed description of the activities and analyses conducted during Phase I of the Manhattan Garment Center Urban Goods Movement Study. Volume I provides an overview of the Garment Center including goods movement and the apparel industry; basic traits and industry trends of the apparel industry; outward movement of contractors; future trends; and an appendix discussing the Standard Industrial Classification System. The report also discusses the apparel industry questionnaire including method of data collection; summary of observations; general characteristics; location of contractor's facilities; characteristics of freight; and exhibits charting the apparel industry questionnaires. The third part of this volume discusses land use and economic data, including building analysis; zoning; assessed value; employment; rents and vacancy rates; and sample block segments.

PB81-109274 PC **A09**/MF **A01**
New York City Transportation Administration. Office of the Administrator.
Manhattan Garment Center Urban Goods Movement Study. Phase I. Appendix Volume II.
Jun 76, 179p UMTA-UPM-02-80-3
Contract DOT-OS-30053
See also Volume 1, PB81-109266 and Appendix Volume 3, PB81-109282.
Also available in set of 5 reports PC E99, PB81-109241.

This report is Appendix Volume II of the Phase I Final Report of the Manhattan Garment Center Urban Goods Movement Study. In this report, the observations made about the difficulties of goods movement in the Garment Center are manifested in the traffic volumes and the characteristics observed, namely, the high traffic volumes (185,000 vehicles traverse the district daily). This report deals with the characteristics of vehicular traffic in the area, including apparel-related and non-apparel related traffic, pedestrian and handcart movements, and their relationship on vehicular activity and congestion. Two graphic models are also presented in this report. The micro model shows the volumes, modes, and times spent per segment of the apparel making process by the typical firm; and the macro model indicates the type and volume of commodities entering, leaving, and circulating within the Center. Costs of the Goods Movement System are also presented, including direct/indirect transportation costs, service costs, and potential cost reductions.

PB81-109282 PC **A08**/MF **A01**
New York City Transportation Administration. Office of the Administrator.
Manhattan Garment Center Urban Goods Movement Study. Phase I. Appendix Volume III.
Jun 76, 157p UMTA-UPM-02-80-4
Contract DOT-OS-30053
See also Volume 2, PB81-109274 and Phase 2, PB81-109290.
Also available in set of 5 reports PC E99, PB81-109241.

The report is Appendix Volume III of the Phase I Final Report of the Manhattan Garment Center Urban Goods Movement Study. The environmental effort of this study includes an analysis of the public costs of goods movement in terms of air and noise pollution and accidents. The public costs of goods movement also include an analysis of carbon monoxide emissions; estimation of the health costs of air pollution; ambient noise conditions; and the relationship of vehicular activity and congestion to accident costs in the New York City Garment Center. This report also presents some of the tools developed during the course of this study for the collection of data. The report contains a bibliography that includes previous Garment Center studies as well as a list of readings.

PB81-109290 PC **A14**/MF **A01**
New York City Transportation Administration. Office of the Administrator.
Manhattan Garment Center Urban Goods Movement Study. Phase II.
Final rept.
Dec 79, 311p UMTA-UPM-02-80-5
Contract DOT-OS-30053
See also Appendix Volume III, PB81-109282.
Also available in set of 5 reports PC E99, PB81-109241.

This Final Report is the culmination of a pioneering effort in the field of urban goods movement (UGM). It is an intensive study of the character and the transportation aspects of New York City's premier manufacturing industry. The study was undertaken to examine and recommend goods movement improvements in the Manhattan Garment Center. The purpose was to relieve traffic congestion and its harmful effects, and thereby strengthen the garment industry's economic ability to function. Many of the proposals examined in the course of this pioneering effort in the field of UGM are potentially applicable to other apparel manufacturing areas as possible solutions to goods movement problems in general. Phase I of this study developed an understanding of the Garment Center's goods movement problems, as well as the implementation of several low capital improvements. Phase II, this report, expanded the knowledge and experience gained to Phase I and developed and recommended a series of significant improvements, both short and long-range.

PB81-109308 PC **A02**/MF **A01**
Nebraska Univ. at Omaha.
Drawbacks Inherent in Currently Used Measures of Mass Transit Performance.
Special rept.,
Darold T. Barnum, and John M. Gleason. May 80, 19p UMTA-NE-11-0002
Prepared in cooperation with Indiana Univ. Northwest, Gary.

The paper examines weakness and biases inherent in certain measures of urban mass transit performance. The concepts of effectiveness and efficiency in transit are discussed, and the shortcomings of some currently used effectiveness ratios are examined. It is noted that many of the effectiveness measures should more properly be classified as efficiency measures. Weaknesses of certain efficiency measures are also examined. The performance measures examined are cost per passenger, passengers per bus hour, vehicle miles per operator, and cost per vehicle hour.

PB81-109407 PC **A10**/MF **A01**
White Sulphur Springs, WV.
Water Systems Study for City of White Sulphur Springs, West Virginia.
Sep 80, 209p EDA-80-0140
Grant EDA-01-6-01888
Prepared by Dewberry, Nealon and Davis, Fairfax, VA.

The City of White Sulphur Springs is located in Greenbrier County, West Virginia. Water from springs is pumped about 10 miles through a 10-inch line to supply both the City and the Greenbrier Hotel. Although the springs produce an abundance of water, serious problems within the distribution system prevent adequate service from being maintained. The purpose of this study is to examine the adequacy of the City of White Sulphur Springs' water system and to determine what improvements are needed to meet current and future demands. The study basically examines supply, storage and the distribution network.

PB81-109431 PC **A07**/MF **A01**
Pabon, Sims, Smith and Associates, Washington, DC.
Emergency Medical Services Highway Sign Evaluation.
Final rept. Aug 79-Apr 80,
Marie J. Smith, and Anita S. Ware. Apr 80, 143p DOT-HS-805 529
Contract DOT-HS-9-02219

The document identifies the needs for a highway sign that will announce significant points or methods of access to the Emergency Medical Services system within the emergency response system. Further, the document validates the use of the 'Star of Life' symbol to meet these needs.

PB81-109696 PC **A04**/MF **A01**
Camp, Dresser and McKee, Inc., Boston, MA.
Compendium on Solid Waste Management by Vermicomposting.
Final rept.
Aug 80, 72p EPA-600/8-80-033
Contract EPA-68-03-2803

Vermicomposting of municipal solid wastes has been attempted only in the last five years and there are presently no full-scale operations. This report assesses the technical and economic feasibility of vermicomposting and is based on several pilot-scale studies conducted by private entrepreneurs. The assessment is based on examining facilities and costs for a municipal operation serving (1) a community of 50,000 persons and (2) a community of about 500,000 persons. Vermicomposting is compared to three other methods of solid waste management: sanitary landfill, windrow composting, and combustion. Vermicomposting

was estimated to cost about $24 to $32 per ton of waste processed.

PB81-109803 PC **A04**/MF **A01**
Arizona Univ., Tucson.
The Political Feasibility of Alternative Strategies for Managing Water Demand in Southern Arizona,
John R. McCain. 15 Sep 80, 52p W81-00007, OWRT-A-085-ARIZ(1)
Contract DI-14-34-0001-8003

Decision-makers are restricted in their choice of alternative policies by physical, economic, attitudinal and legal/institutional constraints, all of which may or not be operative in any particular situation. This report examines the interrelationships between attitudinal and legal constraints in the context of policies for the local development, use and management of water resources in Tucson, Arizona.

PB81-110199 PC **A07**/MF **A01**
Environmental Protection Agency, Denver, CO. Surveillance and Analysis Div.
Water Quality Trends in Region VIII (1979 Data).
Final rept.,
Thomas A. Entzminger, Richard Sotiros, and W. T. Willingham. Oct 80, 145p EPA-908/2-80-001

Water quality trends and status for the calendar year 1979 were determined for the six states in Region VIII. These states include Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming. Statistical tests which detect significant differences between two populations were utilized to show trends in water quality. The status and severity of stream pollutants were determined by comparing observed parameter concentrations to state Water Quality Standards or recognized criteria.

PB81-110207 PC **A04**/MF **A01**
Cooper Union Research Foundation, Brooklyn, NY.
Manual for Surface Discharge Thermal Plume Predictions.
Rept. for Oct 78-Aug 79,
J. C. Cataldo, A. S. Goodman, and V. K. Gunawardana. Aug 79, 63p NYSERDA-79-8
Prepared in cooperation with Polytechnic Inst. of New York, Brooklyn.

This manual outlines procedures for predicting the vertical and horizontal distribution of temperatures from a power plant's thermal plume after the plume is discharged into a natural body of water. The procedures are based on a model developed from measurements of operating power plants and their heated discharges. They have been verified by comparing 1,400 model predictions against the actual temperature measurements from eight power plants. The manual can be used for determining power plant compliance with federal and state thermal water quality standards.

PB81-110819 PC **A07**/MF **A01**
Texas Univ. at Austin. Center for Highway Research.
An Investigation of the Use of Polymer-Concrete Overlays for Bridge Decks.
Research rept.,
Huey-Tsann Hsu, David W. Fowler, Mickey Miller, and Donald R. Paul. Mar 79, 150p CFHR-3-9-71-114-7, FHWA/TX-79-36-114-7
Sponsored in part by Texas State Dept. of Highways and Public Transportation, Austin. Transportation Planning Div. See also report dated Jan 76, PB-274 963.

An investigation was made to determine the feasibility of using a polymer-concrete (PC) overlay to improve the durability of a bridge by sealing the concrete against water penetration. The overlay consisted of a thin (approximately 0.5-in.) layer of polymer and aggregate. Fine aggregate was placed to a dpeth of 1/4 in., and 3/8-in.-maximum-size aggregate was placed and rolled into the sand. Two monomer applications were made. Durability tests, which included freeze-thaw cycling, water tightness, sandblast abrasion, and skid resistance testing, were performed on both treated and untreated slabs. The 24-hour water tightness test showed that the PC overlay could completely seal the concrete against water penetration, while the control specimens had about 2 in. to 2.5 in. (51 mm to 64 mm) of water penetration. The PC overlay proved to be more resistant than the control when subjected to the sandblast abrasion, especially after freeze-thaw cycling. Because the surfaces were sealed against water penetration, the PC overlay specimens showed a greater freeze-thaw durability than the controls, by a factor of at least two. Also, the PC overlay showed a better skid resistance than the control.

PB81-110900 PC **A08**/MF **A01**
Clemson Univ, SC.
Control Strategies for the Activated Sludge Process.
Final rept. Mar 76-Jun 77,
Thomas K. Keinath, and Bryan S. Cashion. Aug 80, 175p EPA-600/2-80-131
Grant EPA-R864357-01-0

The focus of this research centers on strategies to control both mean solids retention time (MSRT) and food to microorganism ratio (F/M). Two solids inventory control strategies were examined: (1) control of the recycle flow rate when provision has been made for a fixed volume storage chamber; and (2) control of the recycle flow rate when provision has been made for a variable volume storage chamber. Both strategies were evaluated by simulation using a structured model. The first strategy was also evaluated through a pilot study conducted at the Blue Plains Pilot Waste Treatment Facility.

PB81-110926 PC **A05**/MF **A01**
PEDCo-Environmental, Inc., Cincinnati, OH.
Industrial Process Profiles for Environmental Use: Chapter 27 Primary Lead Industry.
Jul 80, 83p EPA-600/2-80-168
Contract EPA-68-03-2577

The primary lead industry as defined for this study consists of mining, beneficiation, smelting, and refining. A profile of the industry is given including plant locations, capacities, and various statistics regarding production and consumption of lead, coproducts, and by-products. The report summarizes the various commercial routes practiced domestically for lead production in a series of process flow diagrams and detailed process descriptions. Each process description includes available data regarding input materials, operating conditions, energy and utility requirements, waste streams produced (air, water, and solid waste), and control technology practices and problems.

PB81-110934 PC **A04**/MF **A01**
Cincinnati Univ., OH.
Package Water Treatment Plants. Volume 1. A Performance Evaluation.
Final rept. Jun 77-Jun 79,
James M. Morand, Craig R. Cobb, Robert M. Clark, and Richard G. Stevie. Jul 80, 56p EPA-600/2-80-008A
Contract EPA-GS-05S-10458
See also Volume 2, PB81-102717.

Many small and rural water systems have both cost and quality problems. Their unit costs tend to be higher because of the small number of connections they service. As shown by the Community Water Supply Survey of 1969 many small systems have trouble meeting minimal drinking water standards. Their problems are likely to be compounded in the future as drinking water standards are raised. The cost of building a conventional water treatment plant to provide higher quality water for a small community may be prohibitive. Package water treatment plants are a possible alternative to conventional water treatment. These plants are self-contained units that can be installed for minimum cost. Results from a study of 36 package plants in Kentucky, West Virginia and Tennessee show that these treatment plants can provide water that meets the turbidity limits established under the National Interim Primary Drinking Water Standards.

PB81-110967 PC **A11**/MF **A01**
Manhattan Coll., Bronx, NY.
Mathematical Models of Water Quality in Large Lakes. Part 2. Lake Erie.
Final rept.,
Dominic M. Di Toro, and John P. Connolly. Jul 80, 250p EPA-600/3-80-065
Grant EPA-R-803030

This research was undertaken to develop and apply a mathematical model of the water quality in large lakes, particularly Lake Huron and Saginaw Bay (Part 1) and Lake Erie (Part 2). A mathematical model was developed for analysis of the interactions between nutrient discharges to Lake Erie, the response of phytoplankton to these discharges, and the dissolved oxygen depletion that occurs as a consequence. Dissolved oxygen, phytoplankton chlorophyll for diatoms and non-diatoms, zooplankton biomass, nutrient concentrations in available forms and inorganic carbon are considered in the model. Extensive water quality data for Lake Erie was analyzed and statistically reduced. Recent developments in phytoplankton growth and uptake kinetics are included in this analysis.

PB81-110983 PC **A07**/MF **A01**
Stanford Univ., CA. Dept. of Civil Engineering.
Preparation and Evaluation of Powdered Activated Carbon from Lignocellulosic Materials.
Final rept. Nov 76-Oct 79,
Paul V. Roberts, Douglas M. Mackay, and Fred S. Cannon. Aug 80, 139p EPA-600/2-80-123
Grant EPA-R-803188

This research project was conceived as a preliminary evaluation of the technical feasibility of converting solid wastes into adsorbents suitable for wastewater treatment. The work emphasized the pyrolysis of solid wastes rich in organic constituents, mainly agricultural wastes. The char prepared from one of these materials (prune pits) was subsequently activated for comparison with activated carbons that are widely used in water and wastewater treatment. The chars so prepared showed specific surface areas of 300 to 650 sqm/g, measured by CO2-BET adsorption (195K), but the pores were so small that the solids were penetrated only slowly by N2. Pyrolysis at 700 to 900C resulted in a greater char specific surface than did pyrolysis at 500C. The activated carbons made from prune pits demonstrated favorable adsorption performance, when compared with an activated carbon widely used in water and wastewater treatment. The prune pit char activated at 60 min. demonstrated a higher adsorption capacity and superior adsorption kinetics compared to the commercial product (Filtrasorb 400), when judged according to the uptake of dissolved organic carbon (DOC) from secondary effluent. This difference coincided with a greater surface area and macro- and transitional (3 to 300 nm) pore volume for the activated carbon made from prune pits. An adsorbent made by activation of prune pit char for 42 min. was approximately equivalent to Filtrasorb 400 in every respect.

PB81-110991 PC **A08**/MF **A01**
New York State Dept. of Environmental Conservation, Albany.
A Study of Nitrate Respiration in the Activated Sludge Process.
Final rept. Jul 68-Jul 75,
Carl Beer. Aug 80, 169p EPA-600/2-80-154
Grant EPA-17050-EDL

In an experimental, 570-cum/day (0.15-mgd) activated sludge plant treating domestic wastewater from a correctional facility, 76 to 87 percent nitrogen removal was obtained via sludge synthesis and biological denitrification using endogenous H-donors in a compartmentalized reactor with alternating aerobic and anoxic zones. Between 27 and 48 percent of the influent nitrogen was removed by denitrification and between 37 and 49 percent via sludge synthesis. The process was operated for 8 mo. under comprehensive analytical control. Ferric chloride (FeCl3) was used to enhance phosphorus removal. The lowest winter temperature measured in the aeration tank was 15.9C. An in-line surge tank was employed for flow equalization. Primary settling was not utilized in the first 5 mo. of operation during the 1974-75 winter. This change in treatment strategy reduced nitrogen removal from 82 percent to 78 percent by reducing sharply the amount of nitrogen removed via sludge synthesis.

PB81-111007 PC **A09**/MF **A01**
SCS Engineers, Inc., Redmond, WA.
Wastewater in Receiving Waters at Water Supply Abstraction Points.
Final rept. Aug 77-Jan 79,

Michael D. Swayne, Gregory H. Boone, David Bauer, and John Scott Lee. Jul 80, 200p EPA-600/2-80-044
Contract EPA-68-03-2592

The purpose of this project was to determine how much wastewater and wastewater-derived material from discharges is present in the surface water supplies of U.S. cities of over 25,000 population. The study identifies 1246 municipal water supply utilities using surface water from 194 basins serving 525 cities with populations greater than 25,000. The results are tabulated to show for each utility: the number of upstream wastewater dischargers by type, estimation of cumulated wastewater discharge flow and the ratio of wastewater flow to stream or river flow. The results ranged from 142 utilities with no dischargers identified to many utilities where the wastewater constitutes a major portion of the water supply.

PB81-111023 PC **A08**/MF **A01**
Montgomery (James M.), Inc., Pasadena, CA.
Selenium Removal from Ground Water Using Activated Alumina.
Research rept. Aug 78-Jun 80,
R. Rhodes Trussell, Albert Trussell, and Peter Kreft. Aug 80, 162p EPA-600/2-80-153
Contract EPA-68-03-1515

Laboratory studies were performed to determine optimum conditions for using activated alumina to remove selenium from drinking water supplies. Column tests showed that the capacity of alumina for Se IV decreased as influent pH increased. Best removal of Se IV occurred at pH 5 where 1200 bed volumes of water, with influent concentration of 0.2 mg/l, were treated before breakthrough (Se conc. <0.0 1/2 mg/l) occurred. Tests showed that the fluorometric technique can be used to determine Se IV concentrations.

PB81-111031 PC **A05**/MF **A01**
Los Angeles County Sanitation Districts, Whittier, CA.
Effect of Pretreatment on the Filtration of Low Turbidity Secondary Effluent.
Final rept. Apr 74-May 76,
Leon S. Directo, Ching-lin Chen, and Robert P. Miele. Aug 80, 86p EPA-600/2-80-148
Contract EPA-14-12-150

A pilot study of filtration of secondary effluent was conducted. Turbidity and solids removal were similar for dual vs. trimedia filters, but headloss was higher across the latter. Coagulation-flocculation and sedimentation pretreatment resulted in a filter effluent superior to that when in-line coagulation alone was used and a lower rate of head loss build up. However, the latter produced acceptable results at a much lower cost.

PB81-111049 PC **A13**/MF **A01**
Dallas City Water Utilities Dept., TX.
Ultraviolet Disinfection of Municipal Wastewater Effluents.
Final rept. Jun 74-Aug 76,
Albert C. Petrasek, Jr., Harold W. Wolf, Steven E. Esmond, and D. Craig Andrews. Aug 80, 283p EPA-600/2-80-102
Grant EPA-R-803292
Prepared in cooperation with Texas A and M Univ., College Station.

During this project two different UV exposure and irradiation systems were studied. The first system investigated was the Kelly-Purdy Unit, which consisted of a shallow-tray exposure chamber with 13 UV lamps mounted horizontally 10 cm above the bottom of the chamber. This unit was operated under varying conditions of both flow and depth and generally provided inadequate disinfection, although fecal coliform densities were usually reduced by approximately three logs. The second UV system used during the project was the Model EP-50 manufactured by Ultraviolet Purification Systems, Inc. This exposure chamber consisted of a stainless steel pressure vessel with nine UV lamps running longitudinally through the chamber.

PB81-111064 PC **A08**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
Planning Wastewater Management Facilities for Small Communities.
Final rept. Sep 77-Jun 79,
Patricia L. Deese, and James F. Hudson. Aug 80, 160p EPA-600/8-80-030
Contract EPA-68-03-2614

This manual presents a set of procedures for planning wastewater management facilities for small communities and is directed at areas with populations of under 10,000. It is designed to aid engineers and the communities they serve in evaluating various options for treatment and disposal of wastewater, which range from septic tanks and on-site disposal fields to conventional gravity sewers and centralized treatment plants. Information and techniques are presented for recognizing and evaluating wastewater management problems frequently faced by small communities and for planning the range of facilities which will solve those problems, giving due consideration to costs, community characteristics, and growth management.

PB81-111072 PC **A08**/MF **A01**
Ocean County Sewerage Authority, Bayville, NJ.
Wastewater Solids Utilization on Land Demonstration Project.
Final rept. Jun 72-Oct 76.
Aug 80, 165p EPA-600/2-80-090
Grant EPA-S-801871
Prepared in cooperation with Cook Coll., New Brunswick, NJ.

This is a summary report of a four-year field study of the techniques and environmental effects of applying liquid digested municipal sludge at various rates to sandy coastal plains soils in a humid temperature climate. Some of the most important observations and measurements were effects on groundwater movement and quality, crop quality and yields, air quality, soil properties, and wildlife. Recommendations for safe beneficial sludge use under conditions of the study are presented. The report should be valuable to planners and designers of sludge disposal facilities and to managers of land application sites in humid temperate areas.

PB81-111080 PC **A03**/MF **A01**
Aluminum Co. of America, Alcoa Center, PA.
Pilot Study of Fluoride and Arsenic Removal from Potable Water.
Research rept. Jun 78-Apr 79,
Frederick Rubel, Jr., and Fred S. Williams. Aug 80, 45p EPA-600/2-80-100
Contract EPA-68-03-1351

Pilot plant studies were conducted on the removal of fluoride and arsenic from potable water using activated alumina as the adsorbent. The tests were run using water from the community of Why, Arizona, that contained 3 mg/L fluoride and 0.15 mg/L arsenic. The experimental data show that activated alumina is an effective means of treating this water. Major facts shown by the data are that: (a) arsenic is preferentially adsorbed on the activated alumina, (b) a stronger sodium hydroxide solution (4%) is required during regeneration of the activated alumina for arsenic than is required for fluoride (1%), and (c) the capacity of the alumina for removing fluoride is decreased by any arsenic remaining in the alumina. The pilot studies indicate that the preferred method of treating water with these combined contaminants is the use of two activated alumina columns in series. A schematic of a full-sized treatment plant is included, along with engineering estimates of operating and capital equipment costs for small communities. Operating costs are approximately 5 cents/kL of treated water. (19 cents/1000 gal.)

PB81-111478 PC **A12**/MF **A01**
Michigan Univ., Ann Arbor. Highway Safety Research Inst.
Alcohol/Safety Public Information Materials Catalog. Number 4.
Final rept. 1 Jul 79-30 Jun 80,
Ann C. Grimm, and Kristina R. Huber. Jun 80, 270p UM-HSRI-80-33, DOT-HS-805-549
Contract DOT-HS-9-02209
See also Number 3, Supplement 3, PB-298 460.

The Alcohol/Safety Public Information Materials Catalog is designed for use by persons developing public information programs on alcohol and highway safety. It lists materials produced for campaigns along with journal articles and reports describing and evaluating such programs. Materials and reports listed in the catalog may be borrowed free of charge.

PB81-112658 PC **A05**/MF **A01**
Minnesota Univ., St. Paul. Water Resources Research Center.
The Application of Project Analysis to Natural Resource Decisions,
K. William Easter, and John J. Waelti. Jun 80, 94p WRRC-BULL-103, W81-00023, OWRT-A-999-MINN(50)

This publication is intended to serve as a guide for the application of water project planning and analysis. Included are a perspective from which to review economic decisions; a brief history of evaluation procedures for U.S. water projects; a description of the Water Resources Council's procedures; the basic economics of project evaluation; problems in cost allocation; and individual applications to irrigation, flood control, navigation and related transportation, and recreation and environmental resources. Emphasis is placed on social benefits measured in terms of additions to real product and savings in terms of real resources.

PB81-113086 PC **A06**/MF **A01**
Clemson Univ., SC. Water Resources Research Inst.
Potential Use of the Tiebout Hypothesis in Water Resource Project Evaluation,
E. Brent Sigmon, James C. Hite, Edward L. McLean, Stephen C. Lilley, and Paul E. Lovingood, Jr. May 80, 120p WRRI-86, W81-00073, OWRT-A-040-SC(1)
Contracts DI-14-34-0001-7086, DI-14-34-0001-8043
Sponsored in part by Contract DI-14-34-0001-9043.

A major problem in water resource planning and project evaluation is lack of a common denominator for use in summarizing the various accounts, especially national economic development and environmental quality accounts, required by Principles and Standards promulgated in 1973. The Tiebout hypothesis, which relates an individuals' choice of residence with Quality of Life (QOL) factors, was extended empirically by evaluating tradeoffs between QOL factors to determine the practicability in using this as an approach to overcome the problem in water resource project evaluation.

PB81-113938 PC **A18**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Surface Coating of Metal Furniture - Background Information for Proposed Standards.
Final rept.
Sep 80, 406p EPA-450/3-80-007A

Standards of performance to control emissions of volatile organic compounds (VOC) from new, modified, and reconstructed metal furniture surface coating facilities are being proposed under Section 111 of the Clean Air Act. This document contains information on the background and authority, regulatory alternatives considered, and environmental and economic impacts of the regulatory alternatives.

PB81-800146 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Phosphorus Removal in Sewage Treatment Systems. 1977-August, 1980 (Citations from the NTIS Data Base).
Rept. for 1977-Aug 80,
Diane M. Cavagnaro, and Audrey S. Hundemann. Oct 80, 120p
Supersedes NTIS/PS-79/1064, and NTIS/PS-78/0911. See also 1964-1976, NTIS/PS-79/1063.

The citations cover the removal of phosphorus in sewage treatment systems. Studies are included on precipitation, sewage microbiology, tertiary sewage techniques, system designs, oxygenation, and combined industrial-sewage processes. Land disposal methods are also cited if they discuss the fate of the phosphorus. (This updated bibliography contains 120 citations, 10 of which are new entries to the previous edition.)

PB81-800211 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.

Nitrogen Oxide Air Pollution: Emissions Studies. 1978-August, 1980 (Citations from the NTIS Data Base).
Rept. for 1978-Aug 80,
Diane M. Cavagnaro. Oct 80, 180p
Supersedes NTIS/PS-79/1062, and NTIS/PS-78/0975. Updates NTIS/PS-74/069. See also 1964-1974, NTIS/PS-76/0849, and 1975-1977, NTIS/PS-79/1061.

The bibliography cites studies on emissions from both stationary and mobile sources, emissions factors, regional emission inventories, and general studies. Air quality data is excluded. Nitrogen oxide detection and analysis, industrial control techniques, atmospheric chemistry, and biological effects are covered in Parts 1 through 4. (This updated bibliography contains 174 citations, 62 of which are new entries to the previous edition.)

13C. Construction Equipment Materials, and Supplies

PB81-104648 PC **A03**/MF **A01**
Bureau of Mines, University, AL. Tuscaloosa Metallurgy Research Center.
Evaluating Clay Resources from Clay County, Georgia for Structural Clay Products.
Rept. of investigations 1980,
K. J. Liles, and H. Heystek. 1980, 34p BUMINES-RI-8421
Prepared in cooperation with Alabama Univ., University.

The Georgia Department of Natural Resources, evaluated samples from a clay resource located in Clay County, Ga., for use as a raw material for lightweight aggregate. The physical properties of clay samples, taken from 5-foot increments of drill cores from 11 holes, were determined. Raw materials were plasticized and extruded to produce 1/2-inch by 1-inch pieces and fired in a rotary kiln to produce lightweight aggregate samples. The resulting expanded material had excellent loose pour weights ranging from 30 to 37 lb/cu ft. The expanded test materials were crushed, sized, and used as aggregate to form concrete cylinders. The unit weight and compressive strength of the cylinders averaged 106 lb/cu ft and 3,350 lb/sq in, respectively; these values meet American Society for Testing and Materials specifications for structural concrete. The clay from the drill cores was also used to make test bars that were evaluated for building brick.

SGAE-2898 PC **A03**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Measurement of Stresses in Prestressed Concrete at Elevated Temperatures.
T. Dincmen. Mar 78, 27p RS-130/78
In German.
U.S. Sales Only.

This report deals with the measurement of stresses in the prestressed concrete vessel at the research center Seibersdorf during the prestressing and the thermal stabilization period. The thermal stabilization was carried out at 120 exp 0 C. (Atomindex citation 11:508876)

13F. Ground Transportation Equipment

N80-31795/1 PC **A17**/MF **A01**
Eaton Corp., Southfield, MI. Engineering and Research Center.
Small Passenger Car Transmission Test; Ford C4 Transmission.
Final Report.
M. P. Bujold. Jun 80, 383p NASA-CR-159881, ERC-LIB-8060
Contracts DEN3-124, EC-77-A-31-1044

A 1979 Ford C4 automatic transmission was tested per a passenger car automatic transmission test code (SAE J651b) which required drive performance, coast performance, and no load test conditions. Under these test conditions, the transmission attained maximum efficiencies in the mid-eighty percent range for both drive performance tests and coast performance tests. The major results of this test (torque, speed, and efficiency curves) are presented. Graphs map the complete performance characteristics for the Ford C4 transmission.

N80-31796/9 PC **A19**/MF **A01**
Eaton Corp., Southfield, MI. Engineering and Research Center.
Small Passenger Car Transmission Test; Chevrolet LUV Transmission.
Final Report.
M. P. Bujold. Jun 80, 428p NASA-CR-159882, ERC-LIB-80121
Contracts DEN3-124, EC-77-A-31-1044

A 1978 Chevrolet LUV manual transmission tested per the applicable portions of a passenger car automatic transmission test code (SAE J65lb) which required drive performance, coast performance, and no load test conditions. Under these test conditions, the transmission attained maximum efficiencies in the upper ninety percent range for both drive performance tests and coast performance tests. The major results of this test (torque, speed, and efficiency curves) are presented. Graphs map the complete performance characteristics for the Chevrolet LUV transmission.

N80-32298/5 PC **A09**/MF **A01**
Budd Co., Fort Washington, PA. Technical Center.
A Mass Reduction Effort of the Electric and Hybrid Vehicle.
Final Report.
R. B. Freeman, and H. A. Jahnle. Mar 80, 193p NASA-CR-163520, TCR-0513
Contract JPL-955283
Sponsored by NASA Prepared for JPL.

Weight reduction, cost competitiveness, and elimination of the intrusion beam resulted from the redesign and fabrication using composite materials of the door outer panel and intrusion beam from a Chevrolet Impala. The basis of the redesign involved replacing these two steel parts with a single compression molding using the unique approach of simultaneously curing a sheet molding compound outside panel with a continuous glass fiber intrusion strap. A weight reduction of nearly 11 pounds per door was achieved. Additional weight savings are possible by taking advantage of the elimination of the intrusion beam to design thinner door structures. The parts consolidation approach allows the composite structure to be cost competitive with the original steel design for both the lower production car models and for the near to midterm production vehicles using current state of the art composite production techniques. The design, prototype fabrication, costing, material, properties and compression molding production requirements are discussed.

N80-32299/3 PC **A07**/MF **A01**
Battelle Columbus Labs., OH.
Design Study of Steel V-Belt CVT for Electric Vehicles.
Final Report.
J. C. Swain, T. A. Klausing, and J. P. Wilcox. Jun 80, 131p NASA-CR-159845, DOE/NASA/0116-80/1
Contracts DEN3-116, EC-77-A-31-1044

A continuously variable transmission (CVT) design layout was completed. The intended application was for coupling the flywheel to the driveline of a flywheel battery hybrid electric vehicle. The requirements were that the CVT accommodate flywheel speeds from 14,000 to 28,000 rpm and driveline speeds of 850 to 5000 rpm without slipping. Below 850 rpm a slipping clutch was used between the CVT and the driveline. The CVT was required to accommodate 330 ft-lb maximum torque and 100 hp maximum transient. The weighted average power was 22 hp, the maximum allowable full range shift time was 2 seconds and the required lift was 2600 hours. The resulting design utilized two steel V-belts in series to accommodate the required wide speed ratio. The size of the CVT, including the slipping clutch, was 20.6 inches long, 9.8 inches high and 13.8 inches wide. The estimated weight was 155 lb. An overall potential efficiency of 95 percent was projected for the average power condition.

PB81-105124 PC **A03**/MF **A01**
Michigan Univ., Ann Arbor. Highway Safety Research Inst.
Tolerance and Response of the Knee-Femur-Pelvis Complex to Axial Impacts–Impact Sled Tests.
Final rept. Jul 77-Jun 80,
John W. Melvin, and Guy S. Nusholtz. Jun 80, 34p UM-HSRI-80-27

A series of six whole-body sled tests were conducted with unembalmed cadavers to study knee impact phenomena under simulated car crash conditions. The purpose of the study was to investigate the occurrence of upper leg fracture types not seen in stationary subject knee impact tests (see UM-HSRI-76-33) using a moving-mass impactor technique, and to extend the pulse durations of the knee forces to times greater than 20 ms.

PB81-105355 PC **A02**/MF **A01**
Mobility Systems Equipment Co., Los Angeles, CA.
Safety Assessment of Denver Type I and Standard Type II Barricades via Full Scale Tests. Volume I. Executive Summary.
Final rept.,
Lloyd E. Carlson. Aug 80, 20p R-FH79-13-01-VOL-1, FHWA-RD-79-128
Contract DOT-FH-11-9564
See also Volume 2, PB81-105363.

This report is a summary discussion of tests conducted for the Federal Highway Administration (FHWA) on traffic barricades. The full report may be obtained for reference from Office FHRS, HRS-12 upon request. A series of tests was conducted on Denver Type I Barricades and Standard Type II Barricades in May and June of 1979. The tests were conducted to acquire comparative damage data for the two types of barricades. The Denver Type I Barricades were tested in six different orientations and the Standard Type II Barricades were tested in four different orientations. All orientations of both barricades were impacted with a 1974 Chevrolet Vega vehicle at an impact speed of nominally 96 kmph (60 mph). All tests were recorded with pre and post-impact still photos and with high speed movies during the impact event. Only minor sheet metal damage resulted from any of the impacts. The barricades never touched the windshield as a result of impact in any orientation.

PB81-105363 PC **A05**/MF **A01**
Mobility Systems Equipment Co., Los Angeles, CA.
Safety Assessment of Denver Type I and Standard Type II Barricades via Full Scale Tests. Volume II.
Final rept.,
Lloyd E. Carlson. Jun 79, 91p R-FH79-13-01-VOL-2, FHWA-RD-79-129
Contract DOT-FH-11-9564
See also Volume 1, PB81-105355.

Denver Type I Barricades and Standard Type II Barricades were subjected to impacts with subcompact vehicles at 97 km/h (60 mph) to acquire comparative vehicle damage and safety data. The damage from all impacts was minor. No serious safety hazard resulting from the impacts is apparent. The Denver Type I Barricade represents no significantly different threat to vehicles than does the Standard Type II Barricades. This report contains documentary photographs and detail test data.

PB81-106510 PC **A07**/MF **A01**
Association of American Railroads, Washington, DC.
Intermodal Freight Program-Phase II, Demonstration Management.
Final rept. Feb 77-Jul 80,
Charles F. Yardley. Jul 80, 131p FRA/ORD-80/69
Contract DOT-FR-708-5169

The Intermodal Freight Program was established to develop and demonstrate profitable improved rail intermodal service (the movement of highway trailers and/or containers on rail flatcars). Emphasis was placed on developing the use of multiple

frequency dedicated trains in intermediate distance markets (200-600 miles) dominated by trucks. Railroads operating demonstrations approved under the program were eligible for federal assistance covering 40 to 60 percent of operating losses during periods required to attain profitability. From June, 1978, through May, 1980, the Milwaukee Road operated a demonstration between Chicago and the Twin Cities (Minneapolis/St. Paul). The demonstration involved four dedicated intermodal trains each way each weekday in the corridor. Labor cooperation produced improved productivity in the service and improved capital utilization was attained through rapid equipment turns. A highly reliable service was developed. Milwaukee intermodal traffic in the corridor doubled from predemonstration levels with the additional business being attracted primarily from the highway. Profitability was attained during peak volume periods and possibilities for profit enhancement were identified. The experience gained during the demonstration should be of value to carriers considering similar services.

PB81-108482 PC **A04**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
TRRL Quiet Vehicle Programme: Quiet Heavy Vehicle (QHV) Project,
J. W. Tyler. c1979, 71p TRRL-SUPPLEMENTARY-521

This report describes a cooperative program sponsored by TRRL which has produced heavy diesel engined articulated vehicles having considerably lower external and internal noise levels than vehicles in current operation. The work was aimed at reducing the noise levels from the engine, exhaust and cooling systems and tire-road surface interaction. Results are given from a number of experimental vehicle builds and a demonstration vehicle built to production standards, which emitted no more than 80 dB(A), is described. (Copyright (c) Crown Copyright 1979.)

PB81-108656 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Choice of Model Structure for Car Ownership Forecasting,
J. C. Tanner. c1979, 46p TRRL-SUPPLEMENTARY-523

The report explores a number of issues that have emerged with the publication of the most recent TRRL report on car ownership forecasting, reports on the car ownership element of the Regional Highway Traffic Model, and the report of the Advisory Committee on Trunk Road Assessment. These issues include the form of model to be used, the numerical assumptions and definitions of variables used in calibrating the models, and the methods of calibration. One general conclusion is that, for a given model structure, the forecasts produced depend to an appreciable extent on the precise way in which such quantities as incomes and motoring costs are defined as well as on the views taken on such matters as saturation levels and elasticities. Available data do not give clear indications of the most satisfactory choices. Better understanding of causal mechanisms is necessary to resolve the differences between the presuppositions made in current disaggregate cross-section models and current time-series-based aggregate models. (Copyright (c) Crown Copyright 1979.)

PB81-110090 PC **A06**/MF **A01**
Raskin (S. H.) Corp., Dallas, TX.
Rail Care Component Defect Detection Using Pitless Railway Scales (A Feasibility Study Plan).
Final rept. May-Oct 78,
S. H. Raskin. Sep 80, 101p FRA/ORD-79/50
Contract DOT-FR-8003

This report presents a feasibility study plan to help establish the practicality of utilizing modified pitless-in-motion rail scale systems to detect faulty railroad car components and component systems. This plan considers detecting critical components and performance conditions such as: lateral and vertical rail forces, defective wheels, brakes and bearings, centerplate friction, consist speed, hunting, creep, rock and roll.

PB81-111130 PC **A07**/MF **A01**
STV, Inc., Pottstown, PA.
Evaluation of Signal/Control System Equipment and Technology. Task 4: Electrical Noise Disturbance.
Final rept. Oct 77-Jul 80,
S. F. Taylor, J. F. Marshall, C. M. Schultz, and R. B. Whalen. Jul 80, 133p FRA/ORD-78/39.4
Contract DOT-FR-773-4236
See also report on Task 3, PB80-142441. Prepared in cooperation with Dyer (Thomas K.), Inc., Lexington, MA., and Kentron International, Inc., Dallas, TX.

This report defines electromagnetic interference (EMI) generated by wayside and vehicle-mounted equipment associated with railroad electrification. The report describes the adverse effects of EMI upon existing and potentially applicable signal/control systems. Functional requirements for EMI control are defined and recommendations are made for follow-on testing activity. The problems of vandalism are also considered.

13G. Hydraulic and Pneumatic Equipment

AD-A089 347/9 PC **A06**/MF **A01**
TRITEC Inc Columbia MD
Fineblanking, Diffusion Bonding, and Testing of Fluidic Laminates.
Final rept. May 79-Jul 80,
Lester K. Pecan. Jul 80, 102p HDL-CR-80-074-2
Contract DAAK21-79-C-0074

Two manufacturing processes that show promise of improving the performance of laminated aluminum fluidic components are fineblanking and semi-solid-state diffusion bonding. A representative three-stage amplifier design was used as the basis for evaluating these processes. Amplifier and manifold laminates were produced by fineblanking, and amplifier modules were fabricated by diffusion bonding of the fineblanked laminates. Functional (pressure gain) tests conducted before and after bonding showed gain changes in all bonded modules, but the number of modules bonded was too small to permit determination of any pattern. Surface and dimensional quality of the fineblanked laminates was excellent in laminate thicknesses up to 0.51 mm for amplifier elements, and up to 3.18 mm thickness for manifold laminates. Overall quality was judged to be equivalent to that normally achieved by the photochemical etching process. Due primarily to high initial die cost, fineblanking is economically feasible only where large production quantities are required; diffusion bonding, at the present state-of-the-art, relies heavily on human operator technique and appears to need further development before it can be considered a viable production process. (Author)

13H. Industrial Processes

AD-A089 416/2 PC **A11**/MF **A01**
CR Industries Elk Grove Village IL Mechanical Products Div
Service Life Determination for the UH-60A (BLACKHAWK) Helicopter Elastometric Bearings.
Final rept.,
Seymour A. Hatch. Apr 80, 246p
USAAVRADCOM-TR-80-F-8, AMMRC-TR-80-24
Contract DAAG46-78-C-0029
Report on Manufacturing Methods and Technology (MANTECH) Program.

The contract with AMMRC calls for developing an improved method of predicting the service life of elastomeric bearings in general with specific reference to the Blackhawk main rotor bearings. One object of this study is to develop a correlation between a bearing that has sustained some endurance damage and its remaining service life based on its appearance. The second objective is to develop an analytical capability to predict the service life of bearings without the necessity for testing. An endurance rating for an appropriate elastomer is determined by testing a series of 13 test specimens. The test specimen and the Blackhawk main rotor bearings are analysed by finite element methods. A procedure is developed for relating the complex strain history of the Blackhawk bearings to the endurance data so that a life prediction can be made for the main rotor bearings without testing. The main rotor bearings are then tested and experimental and analytical results compared. (Author)

AD-A089 453/5 PC **A02**/MF **A01**
Rome Air Development Center Hanscom AFB MA Deputy for Electronic Technology
Energy Deposition by Soft X-Rays -- An Application to Lithography for VLSI,
E. A. Burke, and J. C. Garth. 1979, 6p Rept no. RADC/ETR-80-0029
Pub. in IEEE Transactions on Nuclear Science, vNS-26 n6 p4868-4872 Dec 79.

No abstract available.

AD-A089 500/3 PC **A10**/MF **A01**
Defense Technical Information Center Alexandria VA
Etching.
Report bibliography Jan 59-Feb 80.
Sep 80, 207p Rept no. DTIC/BIB-80-04
Supersedes Rept. no. DDC-TAS-73-78, AD-763 100.

This bibliography is a compilation of unclassified/unlimited reports on etching. The collection of references primarily deal with the capabilities and limitation of etching techniques, materials for which they are suitable, and the different etchants and solutions used in the process. The four computer-generated indexes provided are Corporate Author-Monitoring Agency, Subject, Title, and Personal Author. (Author)

AD-A089 631/6 PC **A05**/MF **A01**
Connecticut Univ Storrs Inst of Materials Science
Electron Beam/Laser Glazing of Iron-Base Materials.
Annual progress rept.,
Peter R. Strutt. Jul 80, 76p
Contract N00014-78-C-0580

The development of a programmable scanning system on an electron beam surface melting unit makes it possible to produce a rapidly quenched surface layer on a substrate material. This capability facilitates a fuller characterization of electron beam 'glazed' hard iron-base materials which include M2 tool steel and several alloyed steels dispersion strengthened with titanium carbides particles. These latter materials following 'glazing' treatment exhibit ultra-refinement of the microstructure and microhardness values well in excess of those normally obtained. Preliminary sliding/impact wear studies indicate that relatively thin (approximately 50 micrometers) 'glazed layers' reduce surface erosion, however, isolated cracks form at periodic intervals across the surface. Finally, in a high carbon - low alloy steel 'laser-glazing' and 'E.B.-glazing' produced, in some instances, strikingly different microstructures and correspondingly different microhardness values. It is proposed that the nature of the 'glazing' atmosphere contributes to this effect. The results are consistently interpreted on the basis of the nucleation of martensite by either small oxide or carbide particles. (Author)

N80-31845/4 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
Evaluation and Comparison of Nondestructive Service Inspection Methods.
E. A. B. Degraaf, and P. Derijk. 17 Apr 79, 10p NLR-MP-79005-U
Presented at 9TH World Conf. On Nondestructive Testing, Melbourne, Nov. 1979.

Fatigue cracks in 102 aluminum alloy specimens were inspected with eddy currents, ultrasonics, X-rays, and penetrants. The specimens were then corroded and the inspections repeated. Inspection results were verified by fractographic examination of the opened up fatigue cracks. It was found that: (1) excepting the use of penetrant before corro-

sion, long cracks were missed upon the application of five nondestructive testing (NDT) techniques both before and after corrosion under laboratory conditions; (2) inspection efficiency is governed by crack depth rather than crack length; (3) four out of five NDT techniques applied indicated a theshold length for crack detection; 4) for all the NDT methods the scatter with regard to accuracy increased with decreasing crack length; (5) although these techniques underestimated crack length, eddy current and ultrasonic inspections achieved the same accuracy both before and after corrosion; (6) the accuracy of penetrant inspection decreased significantly after corrosion;(7) sensitivity and probability of detection of all five NDT techniques decreased significantly after corrosion; and (8) before corrosion penetrant is the most reliable, sensitive, and accurate inspection method. After corrosion penetrant remains the most sensitive, but eddy current is more reliable.

13I. Machinery and Tools

AD-A089 179/6 PC **A04**/MF **A01**
Daedalean Associates Inc Woodbine MD
Experimental Research on the Mechanisms of Formation for Spheroids Produced by Cavitation Erosion.
Technical rept.,
Scott E. Hickman, Thomas J. Stansfield, Stephen C. Howard, and William H. Bohli. Aug 80, 58p
Rept no. DAI-TJS-7775-001-TR
Contract N00014-77-C-0648

In modern machinery, a major cause of unscheduled downtime is the wear and eventual failure of load carrying components such as shafts, gears, and bearings. These wear and fatigue failures precipitate wear particles such as metal fragments, shavings, and chips. The mechanisms involved in the formation of wear particles, if understood, would lead to an optimization of the failure prediction method. A potentially important mechanism of wear is the application and release of a local high pressure on a working surface. This wear, known as cavitation erosion, is recognized as a powerfully destructive force in many high speed hydrodynamic systems. Cavitation is one of the major problems confronting designers and users of modern high speed hydrodynamic systems such as pumps, marine propellers, hydraulic turbines, valves and control devices, hydrofoils, sonar domes, other acoustic signal devices, bearings, and diesel engine wet-cylinder liners.

N80-31798/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Observation of Pressure Variation in the Cavitation Region of Submerged Journal Bearings.
I. Etsion, and L. P. Ludwig. 1980, 27p NASA-TM-81582, E-555
Proposed for Presentation at the Lubrication Conf., New Orienas, 11-14 Oct. 1981; Sponsored by the Asme.

Visual observations and pressure measurements in the cavitation zone of a submerged journal bearing are described. Tests were performed at various shaft speeds and ambient pressure levels. Some photographs of the cavitation region are presented showing strong reverse flow at the downstream end of the region. Pressure profiles are presented showing significant pressure variations inside the cavitation zone, contrary to common assumptions of constant cavitation pressure.

PAT-APPL-6-161 615 PC **A03**/MF **A01**
Department of the Navy Washington DC
Portable On-Site Turing Apparatus.
Patent Application,
John F. Wilger, Gregory S. Nakano, Tadao Uyetake, Stephen Orillo, Jr., and Teikichi Higa.
Filed 20 Jun 80, 30p AD-D007 454/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A turning apparatus, intended to be mounted on a work shaft for in-place cutting, may include a pair of mounting rings which are attachable to the shaft and which support a longitudinal annulate frame assembly which rotates about the area to be cut. A drive assembly is mounted on a mounting ring and engages a ring gear attached to the frame assembly for providing it rotational force. A longitudinal track assembly is mounted on and extends between the ends of the frame assembly. A carriage assembly is slidably mounted on the track assembly and is in operational engagement with a lead screw which is also mounted on the track assembly. The carriage assembly is adapted to hold a cutter for machining the shaft surface as the frame assembly rotates. A hydraulic indexing device incrementally rotates the lead screw in synchronism with the rotation of the frame assembly to move the carriage assembly and the cutter along the axis of the work piece. (Author)

PB81-104606 PC **A02**/MF **A01**
Bureau of Mines, University, AL. Tuscaloosa Metallurgy Research Center.
A Rapid-Set Cement Suitable as a Molding Sand Binder for Small Ferrous Castings.
Rept. of investigations 1980,
S. D. Sanders, E. D. Scott, and G. V. Sullivan.
1980, 22p BUMINES-RI-8417
Prepared in cooperation with Alabama Univ., University.

This investigation focused on mixtures of portland cement and high-alumina cement binders for molding sands. The effects on set time and strength of the resulting mold of the quantity of water and the ratio of portland cement to calcium aluminate were determined. The use of several other additions was evaluated with regard to decreased set time and increased mold strengths. Finally, gray cast iron and steel castings were produced using the cement-bonded molds to verify that the mold strength and casting surface finish were satisfactory.

13J. Marine Engineering

AD-A089 17[illegible]/7 PC **A03**/MF **A01**
Naval Academy Annapolis MD
An Attempt to Detect the Importance of Turbulent Boundary Layer in Ship Wave Resistance.
S. M. Calisal. Jul 80, 35p

The Reynolds number of a ship model is increased artificially by using a flat plate leading the model. The turbulence level of the flat plate boundary layer is also altered. A decrease in the calculated wave resistance and measured residual resistance is observed within the Froude number range .2 less than Fr less than .4. The results indicate a viscous wave interaction which can be formulated in terms of the visco elastic properties of turbulent flow. A possible formulation using this procedure is also indicated. (Author)

AD-A089 318/0 PC **A03**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD Ship Performance Dept
The Effect on Blade Erosion of Injecting Air Ahead of a Cavitating Propeller.
Final rept.,
Douglas Dahmer, and Marlin Miller. Mar 80, 42p
Rept no. DTNSRDC/SPD-0915-01

Experiments are described in which air was injected ahead of a propeller operating at a cavitating condition in a nonuniform wake to determine the effect of air on blade cavitation erosion. Experiments were conducted with no air injected and with air injected at different locations ahead of the propeller for two air flow rates. The experimental technique and data collection method are described. The results show that the injection of air ahead of a cavitating propeller significantly reduces the amount of blade erosion. The amount of erosion was found to be dependent on the location and the amount of air injection. (Author)

AD-A089 485/7 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA
An Experimental Investigation of the Effect of Condensate Inundation on Heat-Transfer in a Horizontal Tube Bundle.
Master's thesis,
Donald Eugene Eshleman. Mar 80, 68p

A test facility to evaluate the effect of condensate inundation on heat transfer within a horizontal tube bundle was designed, constructed and validated. Five 15.9 mm (5/8 in.) nominal outside diameter, smooth stainless steel tubes were utilized in a vertical row. They were located in an equilateral triangular array with a spacing to diameter ratio of 1.5. Heat transfer performance was determined for each tube in the bundle. Data was taken by condensing steam at about 21 kPa (3 psia) on the outside of each tube. Each tube was cooled by water on the inside at velocities of 0.78 to 7.0 m/sec (2.56 to 23 ft/sec). The overall heat transfer coefficient was determined directly from experimental data. The inside and outside heat transfer coefficients were determined using the Wilson plot technique. Observation of condensate flow showed lateral droplet motion along the tube in portions of the condenser as well as side drainage, particularly over the first three tubes. Outside heat transfer coefficients were lower than expected when compared to Nusselt theory, possibly due to the effects of secondary vapor flow and/or non-condensable gases. Recommendations to improve validation are provided. (Author)

AD-A089 494/9 PC **A03**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD Ship Performance Dept
Predictions of Powering Performance Including Towrope Pull and the Results of Propeller Disk Wake Survey for the ARS-46 Salvage Ship Represented by Model 5391.
Final rept.,
K. J. Anderson, and W. G. Day. Sep 80, 50p
Rept no. DTNSRDC/SPD-0957-01

Model experiments were conducted in a towing tank to determine the fully appended powering predictions for a preliminary design of a Salvage Ship (ARS-46) fitted with stock propellers. Powering predictions for the ship going astern and for the ship in bollard-pull and towrope-pull conditions are presented. The results of a wake survey experiment performed in the plane of the propeller disk are presented. The harmonic analysis of the circumferential distribution of the longitudinal and tangential velocities are also presented. (Author)

AD-A089 498/0 PC **A10**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD Ship Performance Dept
Full-Scale Propeller Disk Wake Survey and Boundary Layer Velocity Profile Measurements on the 154-Foot Ship R/V Athena.
Final rept.,
William G. Day, Jr., Arthur M. Reed, and Rae B. Hurwitz. Sep 80, 210p Rept no. DTNSRDC/SPD-0833-01

Measurements of propeller disk velocity components have been made for the 154-foot ship R/V ATHENA. Longitudinal, tangential, and radial velocity components are presented for three planes perpendicular to the propeller shaft for full-scale speeds of 9 and 15 knots. In addition, several boundary layer velocity profiles were measured on the full-scale hull. Non-dimensional velocity profiles are presented for several speeds. Finally, the results of an attempt at measuring time dependent velocities ahead of an operating propeller are presented. (Author)

AD-A089 594/6 PC **A07**/MF **A01**
Coast Guard Academy New London CT
Energy Efficiency of Sea and Air Vehicles.
Final rept.,
David A. Jewell. 30 Aug 78, 145p USCGA-01, USCG-D-15-79

A reassessment of overall technical performance parameters of naval vehicles leads to the definition of specific energy as a measure of vehicle efficiency. Specific energy is an energy efficiency equal to the product of transport efficiency and Froude number. In terms of specific energy, the empirical performance data for fluidborne vehicles converge

to yield systematic trends with Froude number for fully-immersed buoyant vehicles, surface ships, and dynamic-lift vehicles. Specific energy appears to be a new consistent basis for comparing the overall technical efficiency of past, present and future naval vehicles. (Author)

PAT-APPL-6-168 974 PC **A02**/MF **A01**
Department of the Navy Washington DC
Flexible Side Connector for Floating and Elevated Platforms.
Patent Application,
Clifford I. Skaalen, and Aruthur B. Rausch. Filed 14 Jul 80, 12p AD-D007 448/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention comprises a flexible side connector assembly comprising an in line flexural system having a plurality of rubber compression elements and a solid shear member. Both the adjacently aligned flexural member and the shear member have grooved solid heads at opposing ends of the assembly for insert of guillotines in opposing platforms which are to be coupled together. The combination of flexibility and rigidity, as found in the instant invention, allows connected platforms to roll with respect to each other. Translation freedom in the vertical, lateral and longitudinal direction is prohibited. Roll around the longitudinal axis of the platforms is allowed or accommodated for. Roll around the lateral and vertical axis of the platforms is prohibited by the fact that two connectors, located toward opposite ends of the abutting sides of two platforms being connected together, form a resisting moment equal to the translational resistance times the distance between each connector.

PB81-100638 PC **A02**
Massachusetts Inst. of Tech., Cambridge. Sea Grant Coll. Program.
Prediction of the Damping-Controlled Response of Offshore Structures to Random Wave Excitation,
J. Kim Vandiver. c1980, 13p MITSG-80-9J, NOAA-80081806
Pub. in Society of Petroleum Engineers Jnl., p5-14 Feb 80.

A method is presented for predicting the damping-controlled response of a structure at a known natural frequency to random wave forces. The principal advantage of the proposed method over those in current use is that the explicit calculation of wave forces is no requred in the analysis. This is accomplished by application of the principle of reciprocity: that the linear wave force specutrum for a particular vibration mode is proportional to the radiation (wave-making) damping of the mode. Several example calculations are presented including the prediction of the heave response of a tension-leg platform. The directional distribution of the wave spectrum is included in the analysis.

PB81-102535 PC **A14**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Sea Grant Coll. Program.
An Assessment of Undersea Teleoperators,
Thomas Nico Sofyanos, and Thomas B. Sheridan. Jun 80, 316p MITSG-80-11, NOAA-80082504
Grant NA79AA-D-00101

Undersea teleoperators, general purpose submersible work vehicles remotely controlled by human operators, offer cost and safety improvements to scientific, military and industrial groups involved in underwater activities. This report assesses the current and near future applications of undersea teleoperators and competing modes of underwater intervention. It identifies the role of remotely operated vehicle systems and the implications on diving safety and underwater inspection of offshore installations. The current development trends for teleoperator systems are examined and federally supported programs are evaluated.

PB81-105306 PC **A05**/MF **A01**
Bell Aerospace Textron, Buffalo, NY.
An Investigation of Methods to Reduce or Eliminate Cavitation Erosion of Ship Propellers by Design Optimization and Protective Coverings.
Final rept.,
P. K. Conn, J. V. Hackworth, and I. C. Snell. Jun 80, 100p 7500-927076, MA-RD-920-80088
Contract MA-6-38075

Effects of wake characteristics (angular width and magnitude of velocity defect) on the erosive nature of cavitation were investigated using a model propeller in water tunnel flows. Wake width appeared to control erosive impact intensity of the cavitation, as measured by the size and rate of formation of pits formed on the polished blades by impact of loads created by collapse of cavitation bubbles. Seven covering materials in combination with 13 primers and adhesives were evaluated in the laboratory. The limiting factors proved to be peel adhesion strength and hydrolytic stability of the covering/propeller bond. The best three polyurethane coverings were applied to a full-scale propeller (21-1/2 ft. dia.) Two of these systems gave encouraging results based on a propeller inspection after 10 months in service.

PB81-108110 PC **A03**/MF **A01**
Massachsuetts Inst. of Tech., Cambridge. Marine Industry Advisory Services.
Some Federally Sponsored Research Programs for Unmanned Underwater Vehicles,
Norman Doelling. 7 Jul 80, 40p MITSG-80-5, OPPORTUNITY BRIEF-18, NOAA-80091501
Index No. 80-605-Eso. Report on MIT/Marine Industry Collegium Program.

Research programs at MIT, the University of New Hampshire, and the Naval Ocean Systems Center are currently addressing issues of theory, systems development and applications of untethered, unmanned, underwater vehicles. The system configurations described here appropriately differ from one another because different missions are forseen for the various vehicles. There is however a common approach to command and control: all the investigators rely directly or by implication on computer control systems. Microprocessors are essential for dealing with the other common theme of the research, namely, how can human operators remote from semiautonomous or supervised machines communicate effectively with them to provide appropriate command and control. The use of multiple microprocessors will allow a modular approach to system building and allow some standardization of hardware and software. Appropriate microprocessor/transducer modules would permit the system builder to have the sonar equivalent of a standard modem with all of the error detection and correcting activities carried out by that control module. It is hoped that a common programming language will be used to develop user software.

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

PB81-108698 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Centrifuge Tests of Flexible Circular Pipes Subjected to Surface Loading,
A. J. Valsangkar, and A. M. Britto. c1979, 42p TRRL-SUPPLEMENTARY-530
Prepared in cooperation with Cambridge Univ. (England). Dept. of Engineering.

The work consists of a series of centrifuge experiments conducted on very flexible model pipes buried at shallow depth in uniform dense sand, to examine the validity of ring compression theory under the combined action of self weight of the backfull and surface loading. Tests were carried out on model pipes made from steel and plastic having different effective stiffness to study the influence of this factor on the reductions in load which takes place due to arching. A comparison is given of the calculated pressures and measured pipe stresses from which load reduction factors are derived. The ring compression theory is shown to be valid for model pipes in wide trenches or under embankments when subjected to combined surface and backfill loadings. The results illustrate that the load reduction factor is influenced by the intensity of surface loading and by the depth of embedment and is greatly dependent on the effective stiffness of the pipe. (Copyright (c) Crown Copyright 1979.)

13L. Safety Engineering

AD-A089 204/2 PC **A05**/MF **A01**
RANN Inc Palo Alto CA
Exploratory Study of Hazard Mitigation and Research in the Air Transport System.
Final rept.,
R. L. Bisplinghoff, P. G. Dembling, A. J. Eggers, Jr., C. W. Harper, and J. D. Young. 31 Mar 80, 99p
Contract EMW-00432

The study examines a series of principles that may effectively mitigate technological hazards within the Air Transport System. These principles are: precise design criteria and verification of the standards which relate to an airplane's operating environment; quality control in manufacturing with high levels of performance in design, construction, inspection, and maintenance of the system; periodic testing and evaluation of equipment and human elements to meet performance standards; training and education of key managers and operators in emergency procedures with emphasis in new systems and multi-problem hazards; establish communication modes linking key elements with institutions in the system to mitigate, respond, and recover from emergencies; a system of reporting incident and accident investigations in a prompt manner to allow for a coordinated recovery; and the system must be regulated, audited, and demonstrated frequently to protect public interest, including proper liability. these principles are then analyzed in three areas in which successful hazard mitigation will reduce the effects of increased technological applications. these topic areas include: Design, Construction, Inspection, and Maintenance; System Development and Operation; and Liability and Regulation. the study concludes that with the rapid development in high technology and with its subsequent rapid application to our National capability, technological hazards converge onto a wide variety of societies' activities. The report suggests that successful mitigation of technological hazards can be achieved through utilizing the previously outlined principles within the total air transport system environment. (Author)

AD-A089 585/4 PC **A07**/MF **A01**
Applied Technology Corp Norman OK
Effectiveness of Fire Control Agents on Chemical Fires. Phase I. Test Methodology and Baseline Hexane Tests.
Final rept.,
J. R. Welker, W. E. Martinsen, D. W. Johnson, and J. N. Ice. Jun 80, 149p ATC-103-FR, USCG-D-50-80
Contract DOT-CG-42355-A
See also AD-A026 300.

A basic test method for comparing relative effectiveness of fire control agents on fires from liquid chemicals was set and modified through developmental tests. The methodology was then demonstrated in a test series intended to produce baseline data for comparison with future test data using other chemicals as fuels. Fuel for the baseline test series was high purity hexane. Tests were run in concrete pits with and without sheet steel wall linings and with and without steel obstructions. Pit (fuel) surface areas were 25, 100, 400 and 1600 sq ft. Foam fire control agents used were low expansion protein, AFFF, and alcohol and a saltwater high expansion foam. Dry chemical agents were used in the three smaller pit sizes and were sodium bicarbonate and potassium bicarbonate, and a urea-potassium bicarbonate reaction product. Agents were applied through fixed systems, with a few manual tests for comparison. Data collected include burning rates; fuel, wall and obstruction temperatures; radiant fluxes; agent flow rates and nozzle pressures; preburn, control, and extinguishment times; and meteorological information. Times were taken by instrumentation or observation and

stopwatch. Tentatively, the best data element for comparison appears to be a plot of application rate versus control time for foams and versus extinguishment time for dry chemical agents. Future tests should establish scaling parameters to allow use of smaller surface areas for the comparative effectiveness tests.

PB81-102048 PC **A05**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Marine Accident Report--Collision of U.S. Coast Guard Cutter BLACKTHORN and U.S. Tankship CAPRICORN, Tampa Bay, Florida, January 28, 1980.
28 Aug 80, 78p NTSB-MAR-80-14

About 2021 e.s.t. on January 28, 1980, the U.S. Coast Guard Cutter BLACKTHORN and the U.S. tankship CAPRICORN collided in Tampa Bay, Florida. As a result of the collision, the BLACKTHORN was capsized and sank, and 23 Coast Guardsmen were drowned. Although refloated, the BLACKTHORN was a total loss. The CAPRICORN experienced hull damage from the collision and subsequent grounding. The cost of repairs to the tankship was estimated at $600,000 and the cost of salvaging the BLACKTHORN was estimated at $1 million. The National Transportation Safety Board determines that the probable cause of this accident was the failure of the BLACKTHORN to keep on the proper side of the channel when meeting another vessel in a bend because the commanding officer failed to adequately supervise the actions of an inexperienced officer-of-the-deck.

PB81-103376 PC **A03**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Railroad Accident Report--Derailment of Amtrak Train No. 7, The Empire Builder, on Burlington Northern Track, Glacier Park, Montana, March 14, 1980.
12 Aug 80, 36p NTSB-RAR-80-6

About 4:00 p.m., on March 14, 1980, westbound Amtrak passenger train No. 7, the Empire Builder, derailed two locomotive units and eight cars while moving at 37 mph through a 6 deg. 8 min. curve on the Burlington Northern track at Glacier Park, Montana. Of the 170 passengers and 20 crewmembers, 115 persons were injured; 35 of the injured were hospitalized. Property damage was estimated to be $546,800. The National Transportation Safety Board determines that the probable cause of this accident was the overturning of the outside rail of a 6 deg. 8 min. curve because the improperly maintained track could not sustain the lateral force generated by the acceleration of the locomotive in the curve. Contributing to the derailment was the failure of the railroad to issue a temporary slow order pending replacement of several defective rails.

PB81-103400 PC **A06**/MF **A01**
Michigan Univ., Ann Arbor. Highway Safety Research Inst.
NCSS Statistics: Passenger Cars.
Special rept. Jan 77-Mar 79,
Leda L. Ricci. Jun 80, 110p UM-HSRI-80-36, DOT-HS-805 531
Contract DOT-HS-8-01944

The National Crash Severity Study (NCSS) is a major accident data collection program of the National Center for Statistics and Analysis (NCSA) of the National Highway Traffic Safety Administration (NHTSA). Data collection began on January 1, 1977 and terminated on March 31, 1979. This report presents tabulations of accidents involving towed passenger cars for the entire twenty-seven month period. Accidents were investigated in seven geographic areas within the continental United States selected so that the aggregate of the areas closely resembles the urbanization distribution of the entire country. Within each area, a stratified sampling plan was used to gather detailed information on passenger cars in accidents severe enough to require that the vehicles be towed from the scene. The combined investigations presented here total 11,386 accidents, 14,805 towed vehicles, 24,976 vehicle occupants, and 917 fatalities. The tables and figures in this report were generated using computer files for a passenger car subset of the NCSS data, and represent only a very broad treatment of the data.

PB81-103848 PC **A06**/MF **A01**
Michigan Univ., Ann Arbor. Highway Safety Research Inst.
Combination Vehicles: Five-Year Accident Experience.
Final rept. Jan-Jul 80,
James O'Day, Lyle Filkins, and Richard Kaplan. Jul 80, 107p UM-HSRI-80-51

Two sources of accident data were used to describe the accident experience of combination vehicles (tractor trailers) over a five-year period. The Fatal Accident Reporting System (FARS), operated by the National Highway Safety Administration, and the highway accident data prepared by the Texas Department of Public Safety form the bases of this study. The accident experience of combination vehicles is contrasted to that of passenger cars throughout the report, and while the document is generally a straightforward presentation of facts from the two data sources, obvious trends and relationships are noted.

PB81-104507 PC **A05**/MF **A01**
Action for Child Transportation Safety, Bothell, WA.
Conference on Child Passenger Protection, Held at Washington, DC on December 10-11, 1979.
Final rept. Feb 79-Mar 80,
Deborah D. Richards. Jul 80, 95p DOT-HS-805-542
Contract NHTSA-9-6340

The report is on the planning and execution of the Conference. The preparation of the agenda, participation of the advisory committee, development of the invitation list, and selection of the site are recounted. An evaluation of the Conference is given, and a description of the contribution of the Public Meeting on Child Transportation Safety to the Conference's success. Appendices provide specific examples of letters, mailing lists, program content and evaluation questionnaires used in the body of the report.

PB81-104762 PC **A03**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Highway Accident Report - Multiple-Vehicle Collision and Fire, U.S. Route 101, Los Angeles, California, March 3, 1980.
9 Sep 80, 30p NTSB-HAR-80-5

On March 3, 1980, at 9:05 p.m., Pacific standard time, a sedan had just entered U.S. Route 101, (the Ventural Freeway) westbound from the Laurel Canyon on-ramp. It was traveling in the far lane of the four-lane roadway, changed lanes to the left, and hit the right front of a gasoline cargo tank truck pulling a gasoline cargo tank trailer westbound in the No. 3 traffic lane. Both vehicles moved left and the tank truck sideswiped a westbound pickout truck in the No. 2 lane. The tank truck forced the pickup left into the median barrier. The tank trailer rolled over the median barrier, was ruptured, and its contents spilled and ignited. The pickup truck and the tank truck, with tank trailer, were destroyed in the fire. Of the seven occupants in the pickup, five died of thermal injuries and the other two were burned severely. The drivers of the sedan and tank truck covered received minor injuries. The National Transportation Safety Board determines that the probable caused of this accident was the improper lane change by the driver of the sedan which hit the tank truck and caused it to move to the left and strike the pickup truck forcing it into the median barrier. The fatalities and injuries were caused by the fire which ensued immediately when gasoline was released from the ruptured tank trailer.

PB81-105629 PC **A02**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Pipeline Accident Report - Municipal Gas Department of Cordele, Georgia, Explosion and Fire, Cordele, Georgia, February 21, 1980.
9 Sep 80, 24p NTSB-PAR-80-5

At 11:10 a.m., e.s.t., on February 21, 1980, an explosion and fire destroyed four stores in a shopping complex, severely damaged an adjoining restaurant, and damaged eight cars in Cordele, Georgia. Gas leaking from a 1-inch service line at 22 psig pressure migrated under a concrete block wall, into a service line trench, under a concrete slab floor, and into a jewelry store where it was ignited by an unknown source. Of the eight persons who were injured, three died later as a result of injuries received in the accident. Buildings and nearby automobiles were damaged extensively; no estimate of the dollar loss was made. The National Transportation Safety Board determines that the probable cause of the accident was the snagging, 3 days before, of a 1-inch steel, gas service line by a backhoe which broke the service line in a threaded connection and also pulled it out of an underground compression coupling 14 feet away. Contributing to the accident were: (1) the falure of the Cordele municipal gas department personnel to check for additional damage to the service line or to conduct a gas leak survey after snagging the line, and (2) the failure of the gas department to inject adequate amounts of gas odorant daily in the gas distribution system to facilitate detection of escaping gas.

PB81-105694 PC **A03**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Marine Accident Report--Collision of U. S. Tankship S. S. EXXON CHESTER and Liberian Freighter M. V. REGAL SWORD in the Atlantic Ocean, Near Cape Cod, Massachusetts, June 18, 1979.
28 Aug 80, 27p NTSB-MAR-80-11

About 1713 e.d.t., on June 18, 1979, the U.S. tankship S.S. EXXON CHESTER and the Liberian freighter M.V. REGAL SWORD collided in dense fog in the Atlantic Ocean southeast of Cape Cod, about 1 nautical mile east of the Boston Harbor Traffic Lane Inbound. As a result of the collision, the REGAL SWORD sank and the bow of the EXXON CHESTER was extensively damaged. However, no one was injured. The National Transportation Safety Board determines that the probable cause of this accident was the failure of the master of each vessel to properly interpret and use the radar information which was available to him. Contributing to the accident were the excessive speeds of both vessels in a dense fog; the failure of the EXXON CHESTER and the REGAL SWORD to reduce speed after hearing a fog signal forward of the beam; the REGAL SWORD's imprecise navigation; the REGAL SWORD's alteration of course to port when the risk of collision existed; and the EXXON CHESTER's alteration of course without accurate information about the location of the REGAL SWORD.

PB81-105702 PC **A03**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Railroad Accident Report--Head-On Collision of Baltimore and Ohio Railroad Company Freight Trains Extra 6474 East and Extra 4367 West, Orleans Road, West Virginia, February 12, 1980.
16 Sep 80, 30p NTSB-RAR-80-9

About 5;55 a.m., on February 12, 1980, two freight trains operated by the Baltimore and Ohio Railroad Company collided head-on at Orleans Road, West Virginia. Extra 6474 East was on track No. 2 traveling at 38 miles per hour as it passed the stop-and-stay signal at Orleans Road and entered a compound curve to the right, where Extra 4367 West was approaching at a speed of 32 mph. The fireman of Extra 4367 West was killed and the engineer and head brakeman were injured; the engineer, conductor, and brakeman of Extra 6474 East were injured. Property damage was estimated to be $1,688,200. The National Transportation Safety Board determines that the probable cause of this accident was the failure of the conductor of Extra 6474 East to see that the train was operated in accordance with the operating rules and the failure of the engineer and head breakman to control the train as required by the signal at Orleans Road. Contributing to the accident was the absence of an adequate safety control device on the locomotive.

PB81-108490 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).

Aspects of Road Layout that Affect Drivers' Perception and Risk Taking,
G. R. Watts, and A. R. Quimby. c1980, 26p
TRRL-LR-920

The report describes perceived risk situations, on a defined driving course in England. The drivers were surveyed to determine their assessments of environmental problems.

PB81-108615 PC **A06**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Railroad Accident Reports - Brief Format, Issue Number 1, 1979.
Rept. for 1 Jan-31 Mar 79.
5 Sep 80, 122p NTSB/RAB-80-3

The publication contains briefs of selected railroad accidents occurring in U.S. railroad operations during fiscal years 1977 and 1978. The brief format presents basic facts, conditions, circumstances, and probable cause (s) in each instance. Additional statistical information is tabulated by types of accidents and casualties related to types of accidents, carriers involved, and casual factors.

13M. Structural Engineering

AD-A089 380/0 PC **A03**/MF **A01**
Battelle Columbus Labs OH
Structural Analysis via Generalized Interactive Graphics - STAGING. Volume I.
Final rept. 28 Jun 76-Sep 79,
L. E. Hulbert, and N. D. Ghadiali. Sep 79, 28p
AFFDL-TR-79-3074-VOL-1
Contract F33615-76-C-3125
See also Volume 2, AD-A089 381.

STAGING (STructural Analysis via Generalized INteractive Graphics) has been developed to give engineers an interactive graphics system for constructing and studying finite element models and for reviewing the results of a finite element analysis. Volume I gives an overview of the general capabilities of the STAGING system. (Author)

AD-A089 381/8 PC **A08**/MF **A01**
Battelle Columbus Labs OH
Structural Analysis via Generalized Interactive Graphics - STAGING. Volume II. User's Guide.
Final rept. 28 Jun 76-Sep 79,
L. E. Hulbert, and C. Scofield. Sep 79, 174p
AFFDL-TR-79-3074-VOL-2
Contract F33615-76-C-3125
See also Volume 3, AD-A089 382.

STAGING (STructural Analysis via Generalized INteractive Graphics) has been developed to give engineers an interactive graphics system for constructing and studying finite element models and for reviewing the results of a finite element analysis. Volume II gives detailed instructions on how to use STAGING for finite element analysis.

AD-A089 382/6 PC **A08**/MF **A01**
Battelle Columbus Labs OH
Structural Analysis via Generalized Interactive Graphics - STAGING. Volume III. System Manual.
Final rept. 28 Jun 76-Sep 79,
L. E. Hulbert, N. D. Ghadiali, and F. N. Deobot. Sep 79, 158p AFFDL-TR-79-3074-VOL-3
Contract F33615-76-C-3125
See also Volume 4, AD-A089 383.

STAGING(STructural Analysis via Generalized INteractive Graphics) has been developed to give engineers an interactive graphics system for constructing and studying finite element models and for reviewing the results of a finite element analysis. Volume III describes the internal structure of STAGING and details procedures for installation and Maintenance of the System on CDC CYBER and 6000 series mainframe computers.

AD-A089 383/4 PC **A08**/MF **A01**
Battelle Columbus Labs OH
Structural Analysis via Generalized Interactive Graphics - STAGING. Volume IV. Appendices to System Manual.
Final rept. 28 Jun 76-Sep 79,
L. E. Hulbert, and C. Scofield. Sep 79, 158p
AFFDL-TR-79-3074-VOL-4
Contract F33615-76-C-3125
See also Volume 1, AD-A089 380.

STAGING(STructural Analysis via Generalized INteractive Graphics) has been developed to give engineers an interactive graphics system for constructing and studying finite element models and for reviewing the results of a finite element analysis. Volume IV includes appendices to the System Manual (AD-A089 382). These appendices list the various STAGING procedures, loader directives, and cross-referenced tables of all entry names that occur in the STAGING system.

AD-A089 686/0 PC **A03**/MF **A01**
Northwestern Univ Evanston IL Technological Inst
Critical Damping in Certain Linear Continuous Dynamic Systems.
Technical rept.,
D. E. Beskos, and B. A. Boley. Aug 80, 29p Rept no. TR-1980-2
Contract N00014-75-C-1042

Free damped vibrations of linear elastic structures composed of uniform beam elements with a continuous distribution of mass are studied. Axial, torsional and flexural vibrations are considered. The amount of damping, which can be either internal or external viscous type, varies among the various beam elements of the structure resulting in many critical damping possibilities. A general method is developed, which, with the aid of dynamic stiffness influence coefficients defined for every element, determines the 'critical damping surfaces' of the system. These surfaces represent the loci of combinations of amounts of damping leading to critically damped motion and thus separating regions of partial or complete underdamping from those of overdamping. The dimension of a critical damping surface is equal to the number of independent amounts of damping present in the system, while the number of these surfaces is infinite, i.e., equal to the number of degrees of freedom of the system. Three examples are presented in detail to illustrate the proposed method for determining critical damping and demonstrate its importance. (Author)

N80-31841/3 PC **A04**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
Remote Measurement of Crack Growth in Double Cantilever Beam (DCB) Specimens.
H. P. Vanleeuwen, L. Schra, and A. M. Otter. 1979, 62p NLR-TR-79006-U

A method is suggested to determine crack length and load or load line crack opening displacement by measuring beam separation and free end rotation on extensions to the free ends of a double cantilever beam specimen. Application of the method to specimens with real stress crack corrosion cracks gave large discrepancies between crack lengths derived from calibration data for slits and crack lengths measured by direct observation of the specimen surface. Also, on the basis of a few calibration runs made on a specimen with a real crack, it is concluded that the calibration curves for specimens with slits may differ appreciably from those for specimens with real cracks. A discrepancy was noted between the relations of free end rotation to cract length observed between a specimen which was left to cract freely and a specimen which was recalibrated repeatedly during the test.

PB81-101859 PC **E02**/MF **E02**
Building Research Establishment, Princes Risborough (England). Princes Risborough Lab.
Appraisal of Assessment Procedures for Impact Resistance of Vertical Surfaces.
Current papers,
R. P. Thorogood. c1978, 19p CP-32/78

It is apparent from an examination of recently constructed buildings that the impact resistance of wall surfaces is sometimes inadequate. In this paper the guidance available on the performance attribute 'impact resistance' is examined. Recent proposals for assessment procedures both in this country and abroad are outlined. (Copyright (c) British Crown Copyright.)

PB81-101875 PC **E02**/MF **E02**
Building Research Establishment, Princes Risborough (England). Princes Risborough Lab.
Basements in Housing: A Feasibility Study.
Current papers,
S. A. Covington. c1978, 15p CP-4/78

A study has been made of the feasibility of providing habitable basements in housing. In the study, alternative methods of constructing basements were examined, basement house plans were developed and a comparison was made, on a cost and amenity basis, of basement houses and comparable non-basement houses. It is shown that, in general, basement houses are more expensive on both flat and sloping sites than the nearest comparable non-basement houses. When measured as cost per unit of 'useful shell area' (i.e. the floor area excluding circulation areas and garage) the basement house is 22 percent to 28 percent more expensive on flat sites and 8 percent to 11 percent more on sloping sites. However, the notional plot area required for basement houses is less, giving scope for higher densities of development and reduced land costs. (Copyright (c) British Crown Copyright.)

PB81-101883 PC **E02**/MF **E02**
Building Research Establishment, Princes Risborough (England). Princes Risborough Lab.
Clear Spanning First Floors in Housing.
Current papers,
S. A. Covington. c1978, 10p CP-22/78

The report summarizes the findings of a study to examine the effects on building procedures and on the flexibility of occupation, of providing first floor structures which span clear between external walls. It compares, on a cost basis, alternative methods of constructing the floors in timber, steel and concrete. (Copyright (c) British Crown Copyright.)

PB81-101909 PC **E02**/MF **E02**
Building Research Establishment, Princes Risborough (England). Princes Risborough Lab.
Moisture in the Walls of Timber-Framed Dwellings.
Current papers,
R. P. Thorogood, and D. F. G. Rodwell. c1978, 16p CP-16/78

This paper reports recent investigations carried out by the Princes Risborough Laboratory of BRE into the moisture content of external walls to occupied timber-framed houses. The effect of moisture on the structure of this type of house is discussed and the results of two surveys are given. The effect of additional insulation on the moisture content of timber members (via increased interstitial condensation) was investigated as was the effect of year-to-year climate. For the former, evidence was conflicting, other factors having more influence. The results of the latter showed considerable uniformity from year-to-year regardless of climatic variations. (Copyright (c) British Crown Copyright.)

PB81-104366 Not available NTIS
National Bureau of Standards, Washington, DC.
Dimensional Coordination in Building.
Final rept.,
H. J. Milton. May 80, 18p
Pub. in AIA Metric Building and Construction Guide, ch6 p43-60 May 80.

The chapter provides a general outline of the concepts of metric dimensional coordination in building, based on the international building module of 100 mm, and selected multimodules. The development of the idea of dimensional coordination in the U.S. is traced and contrasted with international developments. Definitions are provided of dimensional coordination and modular coordination. Major elements of a systematic approach to dimensional coordination are listed and include: modules and preferred dimensions; space reference systems, or grids; functional activity spaces; controlling dimensions for building design; coordinating dimensions for building products and assemblies; production (work) sizes, rules of fit, and joints; construction layout; and, drawing conventions, symbols and definitions. These elements are illustrated as needed. Detailed discussion deals with: modules and modular dimensions, including a rationale for their selection; reference grids; horizon-

tal, vertical and intermediate controlling dimensions in building; and, preferred component and assembly sizes, and a matrix for their systematic selection. Suggestions for preferred dimensions and sizes are made for a number of building products, such as panels, masonry units, boards, sheet materials, tiles, partitions, doorsets, windows, skylights, and spacing of concealed members. Advantages of dimensional coordination, and pros and cons, have been summarized.

PB81-104382 Not available NTIS
National Bureau of Standards, Washington, DC.
The Effect of Metrication on Building Codes and Standards.
Final rept.,
C. T. Mahaffey. May 80, 6p
Pub. in AIA Metric Building and Construction Guide, ch9 p85-90 May 80.

The chapter contains an analysis of major metric conversion issues relating to U.S. building standards and codes, with special emphasis on the need for proper planning and coordination. Among technical issues in the change, both the selection of correct SI units, and the consideration of dimensional coordination in the selection of new and preferred metric dimensions are stressed. International progress in standardization and in the harmonization of building regulations is addressed.

PB81-104390 Not available NTIS
National Bureau of Standards, Washington, DC.
SI Units in Architecture.
Final rept.,
H. J. Milton, and R. T. Packard. May 80, 8p
Pub. in AIA Metric Building and Construction Guide, ch3 p13-20 May 80.

The chapter provides advice on conversion approaches, preferred dimensions and values, and SI units for use in architecture and building. Specific discussions relate to SI units for length, area, volume and section modulus, mass, time, and temperature.

PB81-107393 PC **A99**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Wind and Seismic Effects: Proceedings of the Joint Panel Conference of the U.S.-Japan Cooperative Program in Natural Resources (10th) Held at Gaithersburg, Maryland on May 23-26, 1978.
Final rept.,
H. S. Lew. Oct 80, 649p NBS-SP-560
Library of Congress catalog card no. 79-600134. See also report dated Sep 78, PB-286 993.

This volume includes thirty eight technical papers presented at the Tenth Joint Meeting of the U.S.-Japan Panel's eight task committees. The subjects covered in the Joint Meeting include: (1) natural wind characterization and extreme wind records, (2) characterization of earthquake ground motions and strong-motion earthquake data, (3) engineering seismology, (4) response of hydraulic and earth structures to seismic forces, (5) structural responses to wind loading, (6) recent developments in seismic design criteria, (7) design and analysis of special structures, (8) damage evaluation, repair and retrofit, (9) earthquake hazard mitigation, and (10) storm surge and tsunami.

14.

METHODS AND EQUIPMENT

14B. Laboratories, Test Facilities, and Test Equipment

AD-A089 221/6 PC **A04**/MF **A01**
New Mexico State Univ Las Cruces Engineering Experiment Station
Experimental Measurement Techniques.
Final rept.,
Stuart A. Schleusener. Aug 80, 71p ARO-13685.2-GSX
Grant DAAG29-76-G-0165

A pellet spectrophone has been designed and constructed to measure low level absorption by atmospheric dust and other particulate matter. It was shown that an absorption-to-scattering sensitivity greater than 50 can be achieved, which is a necessary property for measuring absorption at short wavelengths. Detection capability of microwatts of absorbed energy is also possible with this system. Therefore, milliwatt sources and microgram samples may be utilized. Even though the pellet spectrophone responds primarily to absorbed energy it does not result in any data directly convertible to determination of the imaginary part of the complex refractive index except, perhaps under special conditions. This is due to problems regarding particle size distribution and involvement of the real part in scattering interactions. However, if all of these problems are recognized, use of the pellet spectrophone does result in good measurements of the absorption coefficient of the suspended material at whatever wavelengths tested and at whatever size distributions that exist in the host KBr pellet.

AD-A089 265/3 PC **A03**/MF **A01**
Royal Signals and Radar Establishment Malvern (England)
Developments in United Kingdom Waveguide Power Standards,
P. J. Skilton. Apr 80, 50p RSRE-80006, DRIC-BR-75034

The United Kingdom national standards for power in waveguide consist of bolometer mounts of known efficiency at discrete frequencies from 8.2 GHz to 35 GHz. This report outlines recent developments in the design, construction, calibration and use of the standards. An analysis of random and systematic uncertainties in the microcalorimeter method of calibration forms a significant part of the report and yields an overall uncertainty of + or - 0.1% in the mount efficiency with 95% confidence. Features of a technique for calibrating power meters in terms of a bolometer standard using a waveguide transfer instrument are described together with an analysis of uncertainty in the technique. Comparisons in the past five years of the RSRE developed standards with other power standards are also summarised. (Author)

AD-A089 319/8 PC **A03**/MF **A01**
Cornell Univ Ithaca NY Dept of Chemistry
Direct Digitization System for Quantification in Ion Microscopy.
Interim technical rept.,
B. K. Furman, and G. H. Morrison. 16 Sep 80, 30p Rept no. TR-3
Contract N00014-80-C-0538

A system for the quantification of secondary ion mass spectrometric images produced by an ion microscope is presented. The Microscopic Image Digital Acquisition System (MIDAS) developed in this laboratory by coupling a CAMECA IMS-300 ion microscope, a low light level TV camera, a video color graphics system and digital image processing techniques, is described. Ion images detected by the television camera are converted in real time into matrices of point intensities, maintaining the spatial resolution of the original image. These image matrices may then be converted to ion intensity space, or by the use of standards, to concentration. The use of ion implantation to fabricate image standards is presented as an evaluation of MIDAS. Applications of color display as a means of conveying compositional morphological information are demonstrated. (Author)

AD-A089 348/7 PC **A02**/MF **A01**
Army Facilities Engineering Support Agency Fort Belvoir VA Technology Support Div
Infrared Utilization.
Final rept.,
Alan J. Van den Berg. 25 Apr 80, 25p Rept no. USAFESA-TS-2084

Information regarding the use of infrared instrumentation and where such use may be technologically feasible and cost effective. (Author)

AD-A089 369/3 PC **A03**/MF **A01**
Army Electronics Research and Development Command Fort Monmouth NJ Electronics Technology/Devices Lab
Data Acquisition System for Panama Field Tests.
Technical rept.,
J. Erickson, and T. Redgate. Jul 80, 49p Rept no. DELET-TR-80-12

This report covers the design and development of automatic test equipment used to evaluate transistor, microcircuit, and hybrid circuit devices undergoing field tests in the Panama Canal Zone. The devices under test are returned annually to the ERADCOM, Electronics Technology & Devices Lab, Fort Monmouth, for data collection and data processing. The test system is computer-controlled, providing automatic device parameter measurement and data manipulation, which include data editing, data printouts, and device performance summaries. (Author)

AD-A089 376/8 PC **A03**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Operating Manual for Transonic Wind Tunnel Laser Interferometer.
Technical memo.,
N. Pollock. Mar 80, 31p Rept no. ARL/AERO-TM-321

This memorandum describes the setting up and operation of the ARL transonic wind tunnel laser interferometer. Notes on suitable tests for interferometric investigation and interferogram analysis are also included. (Author)

AD-A089 377/6 PC **A03**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
An Introduction to Dynamic Derivatives (3) Methods of Oscillating Models in Pitch and Yaw in a 530 by 810 Millimetre Transonic Wind Tunnel.
Aerodynamics note,
G. F. Forsyth. Apr 79, 49p Rept no. ARL/AERO NOTE-390

Mechanisms are considered which allow models to be oscillated in pitch and yaw during wind tunnel tests to measure dynamic derivatives. Types of pivots, motion producing linkages and connecting linkages are described as applicable in a 530 by 810 millimeter Transonic Tunnel. (Author)

AD-A089 438/6 PC **A03**/MF **A01**
Arnold Engineering Development Center Arnold Air Force Station TN
Holographic Interferometry and Image Analysis for Aerodynamic Testing.
Final rept. 1 Oct 76-30 Sep 78,
J. E. O'Hare, and W. T. Strike. Sep 80, 45p Rept no. AEDC-TR-79-75
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

This report summarizes the progress achieved in the von Karman Gas Dynamics Facility (VKF) of the Arnold Engineering Development Center (AEDC), Air Force Systems Command (AFSC) in the: (1) development of operational techniques and hardware for recording holographic interferograms in the VKF wind tunnels, (2) development of automated image analysis techniques for reducing quantitative flow-field data from holographic interferograms, and (3) investigation and development of software for the application of digital image analysis to other photographic techniques used in wind tunnel testing. (Author)

AD-A089 515/1 PC **A03**/MF **A01**
Royal Aircraft Establishment Farnborough (England)
Possible Methods for Removing Small Airborne Particles from the Flow in the 5-Metre Pressurized Low-Speed Wind Tunnel.
Technical memo.,
P. J. Butterworth. 6 Dec 79, 26p RAE-TM-AERO-1826, DRIC-BR-73802

Because of the size and complexity of the 5-metre wind tunnel, its use raises problems of erosion of wind-tunnel models which have not been encountered with other low-speed facilities. Two methods for removal of small particles have been investigated. They are: (1) the use of fine mesh fabric screens as filters; and (2) by aerodynamic separation at the corners of the tunnel circuit. (The latter investigation involves the computation of the trajectories of particles in a turning flow.) The results show that particles smaller than 0.3 mm cannot be filtered out within the practicable pressure drop limitations of the tunnel circuit. However, small particles have a sufficiently high probability of striking the concave surfaces of the corner vanes that if grease or some other retentive material were applied the particles could be quickly removed from the circuit. This latter method is being kept in reserve for the 5-metre tunnel, since physical means such as sweeping and vacuum cleaning have so far seemed to give adequate results. After lengthy shutdowns for maintenance of the 8 ft by 8 ft tunnel at RAE Bedford, the lower parts of the corner vanes of that tunnel are coated with a suitable grease to remove small airborne particles. (Author)

AD-A089 581/3 PC **A02**/MF **A01**
MARK Resources Inc Marina Del Rey CA
Recommendations for Upgrading RFSS to Meet Near-Term Requirements.
Technical note,
R. L. Mitchell. 20 Jul 78, 2p Rept nos. MRI-148-28, MRI-TN-105-048
Contract DAAK40-78-C-0031

After reviewing the plans for the near term it appears that several more taps are going to be required for the tapped-delay line modulator. To accommodate a range resolution of .02 microsec (10 ft) we must space the taps by .01 microsec (5 ft) for the extended target simulation. If the target is 60 ft in length, it will encompass 12 taps plus about 4 more for 'end effects'. It is therefore recommended that the tapped-delay line modulator be extended to 16 taps. No additional digital processing hardware would be required for extended targets. For clutter we would require 32 taps and modulators on 3 channels if the clutter were independent from range gate to range gate. However, additional processing hardware would be required to generate the modulation signals, namely several (approximately 4) AP120B's. It is therefore recommended that a simpler form of clutter be implemented that is consistent with the hardware for the extended target simulation. (Author)

AD-A089 582/1 PC **A02**/MF **A01**
MARK Resources Inc Marina Del Rey CA
Comments to H. Mott's Memo (1).
Technical note,
R. L. Mitchell. 14 Sep 78, 4p Rept nos. MRI-149-32, MRI-TN-105-049
Contract DAAK40-78-C-0031

There are two fundamental methods of generating clutter signals: (1) The three-parameter model, and (2) the real-time FFT approach. While the first method is computationally very fast, it is severally limited in its flexibility to approximate the spectral shapes of the three monopulse channels. The FFT approach is an exact one, in that any spectral shape can be accommodated. However, the real-time constraint forces us to use approximations even in this case. But with the program delivered the accuracy is generally within 2 or 3 dB for a wide variety of engagement geometries, compared to a 10 or 15 dB accuracy that would result with the three-parameter model. It was determined in May 78 that no tapped-delay lines would be available for the tests in the fall 78. Therefore it was recommended that the more exact approach, namely the one based on the real-time FET should be implemented for the Tri-Fast tests. Because of the more time-consuming computation, this program can only be used for a single range gate, at least with the present digital computation capability at the RFSS. (Author)

AD-A089 623/3 PC **A03**/MF **A01**
Spire Corp Bedford MA
SPI-Pulse (trademark) 25. Transmission Line Pulser Operating Manual.
1978, 26p Rept no. TR-78-39

The 50-ohm SPI-PULSE 25 transmission line pulser is designed to generate high-voltage, fast-risetime pulses over a range from 0 to 1,000 volts without internal adjustment. Pulse width, amplitude, and repetition rate are individually controlled by the operator. The instrument can be triggered internally or externally, either by single shot or repetitively up to 275 hertz. The SPI-PULSE 25 uses a low-reactance, high-voltage switch packaged in a 50-ohm geometry to discharge a transmission line charge store. Discharging the line into a matched, 50-ohm load results in a step-function wave of one-half the stored voltage traveling down the transmission line in transit time tau, reflecting off the open end of the transmission line, and returning at the same amplitude in a second period of transit time tau. Thus a square pulse with an amplitude one-half that of the storage voltage and a width of 2 tau is produced. Typical applications for this high-performance pulser include laser diode pulsing in fiber optic communications research, timing signal generation, current injection testing to establish EMI burnout levels, and high-voltage instrument calibration.

JINR-10-12344 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Software of the on-Line System with the TPA-70 Computer for Superconductor Energy Losses Measuring.
1979, 8p
In Russian.
U.S. Sales Only.

Software is described for the on-line system with the TPA-70 computer intended for measuring energy losses in superconducting cables and magnets. The programs are written in ASSEMBLER language with relocatable addressing and occupy the storage capacity about 5K of 16 - bit words. The software structure allows a complete and effective usage of TPA-70 standard software for data processing. (Atomindex citation 11:511535)

NUREG/CR-0961 PC **A04**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Qualification Test Results on 1550 degrees C and 2200 degrees C 1/16-Inch O.D. Fuel Centerline Thermocouples for the LOFT Program.
Topical rept. 1977-79,
C. P. Cannon, and A. I. Y. Chan. Sep 80, 65p
HEDL-TME-79-50

The technology and commercial vendors have been developed for fabrication of thermocouples to measure fuel centerline temperatures to 22000C in the LOFT reactor. Two model A and one model B qualification thermocouples satisfied all test requirements during life tests at 2200C and 1550C. The emf output drifted less than 2% during 400 hour tests at the maximum test temperatures of 2200C and 1550C. Measurement performance remained unimpaired after 145C/s transient survival tests. The thermocouples did not meet the time response requirement of one second. Time responses of 4-1/2 seconds at 1550C and 2-1/2 seconds at 2200C were measured. However, this result was not considered too negative to preclude useful temperature measurement of fuel centerline temperatures in the LOFT reactor. The first qualification thermocouples satisfied all other test requirements.

N80-31413/1 PC **A05**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Development and Validation of a Hybrid-Computer Simulator for a Transonic Cryogenic Wind Tunnel.
J. J. Thibodeaux, and S. Balakrishna. Sep 80, 84p NASA-TP-1695, L-13691

A study was undertaken to model the cryogenic wind tunnel process, to validate the model by the use of experimental data from the Langley 0.3 Meter Transonic Cryogenic Tunnel, and to construct an interactive simulator of the cryogenic tunnel using the validated model. Additionally, this model was used for designing closed loop feedback control laws for regulation of temperature and pressure in the 0.3 meter cryogenic tunnel. The global mathematical model of the cryogenic tunnel that were developed consists of coupled, nonlinear differential governing equations based on an energy state concept of the physical cryogenic phenomena. Process equations and comparisons between actual tunnel responses and computer simulation predictions were examined. Also included are the control laws and simulator responses obtained using the feedback schemes for closed loop control of temperature and pressure were also included.

N80-31428/9 PC **A06**/MF **A01**
Michigan Univ., Ann Arbor. Space Physics Research Lab.
Design Study for Electronic System for Jupiter Orbit Probe (JOP).
Final Report, 14 Feb. - 30 Sep. 1978.
B. P. Elero, Jr., and G. R. Carignan. 30 Sep 78, 115p NASA-CR-160021, REPT-016117-1-F
Contract NAS5-24454

The conceptial design of the Jupiter probe spectrometer is presented. Block and circuit diagrams are presented along with tabulated parts lists. Problem areas are considered to be (1) the schedule, (2) weight limitations for the electronic systems, and (3) radiation hardness of the electronic devices.

N80-31775/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Data Acquisition Technqiues for Exploiting the Uniqueness of the Time-of-Flight Mass Spectrometer: Application to Sampling Pulsed Gas Systems.
K. A. Lincoln. Aug 80, 15p NASA-TM-81224, A-8308
Presented at the Dyn. Mass Spectrometry Symp., Canterbury, England, 7-10 July 1980.

Mass spectra are produced in most mass spectrometers by sweeping some parameter within the instrument as the sampled gases flow into the ion source. It is evident that any fluctuation in the gas during the sweep (mass scan) of the instrument causes the output spectrum to be skewed in its mass peak intensities. The time of flight mass spectrometer (TOFMS) with its fast, repetitive mode of operation produces spectra without skewing or varying instrument parameters and because all ion species are ejected from the ion source simultaneously, the spectra are inherently not skewed despite rapidly changing gas pressure or composition in the source. Methods of exploiting this feature by utilizing fast digital data acquisition systems, such as transient recorders and signal averagers which are commercially available are described. Applications of this technique are presented including TOFMS sampling of vapors produced by both pulsed and continuous laser heating of materials.

N80-31778/7 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Investigation of Electrical Noise in Selenium-Immersed Thermistor Bolometers.
J. L. Tarpley, and P. D. Sarmiento. Aug 80, 30p NASA-TM-82001

The selenium immersed, thermistor bolometer, IR detector failed due to spurious and escalating electrical noise outburst as a function of time at elevated temperatures during routine ground based testing in a space simulated environment. Spectrographic analysis of failed bolometers revealed selenium pure zones in the insulating selenium arsenic (Se-As) glass film which surrounds the active sintered Mn, Ni, Co oxide flake. The selenium pure film was identified as a potentially serious failure mechanism. Significant changes were instituted in the manufacturing techniques along with more stringent process controls which eliminated the selenium pure film and successfully produced 22study bolometers.

N80-31781/1 PC **A04**/MF **A01**
Centro Informazioni Studi Esperienze, Milan (Italy). Servizio Documentazione.
The Effects of Radiation on Materials. Instrument Design and Calibration Gli Effetti Della Radiazione Nei Materiali. Progetto E Messa a Punto di Alcune Apparecchiature.
E. Caruso, F. Cristofori, L. Filoni, A. Gray, and A. Decesare. Oct 79, 70p CISE-1524
In Italian; English Summary.

The design of an irradiation creep apparatus, the equipment for the automation of thermal treatments and of electrical resistivity measurements, and a magnetic susceptibility balance are described. These instruments are used to study the behavior of radiation damaged materials. An introduction concerning magnetic properties of materials is given.

N80-31846/2 PC **A04**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
Methods for the Interpolation and the Extrapolation of the Results of Creep Rupture Tests.
H. P. Vanleeuwen. 27 Feb 79, 71p NLR-MP-79007-U
Text in Dutch; English Summary. Presented at Meeting of the Creep Comm. Of the Netherlands Soc. Of Mater. Sci., Cleveland, 30 Mar. 1979.

A survey of extrapolation methods, graphic analysis, statistics and mathematical models relevant to creep rupture are presented. Minimal commitment and discrete function values, and creep diagrams are also discussed.

N80-31863/7 PC **A04**/MF **A01**
Centro Informazioni Studi Esperienze, Milan (Italy). Servizio Documentazione.
Sensors for Remote Sensing Sensori Per Telerilevamento.
E. M. Bastida, F. Gardossi, A. Sona, F. Svelto, and V. Svelto. Jan 79, 53p CISE-N-190
Text in Italian; English Summary.

The most important remote sensing methods are discussed. Particular attention is devoted to the sensors, defined as the components transforming the electromagnetic information into usable data. Photographic methods, radar and microwave methods, and applications of infrared and laser radiation are included.

N80-32187/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
The Influence of Wall Resonances on the Levitation of Objects in a Single-Axis Acoustic Processing Chamber.
B. B. Ross. Sep 80, 11p NASA-TM-78299

Instabilities were observed in high temperature, single axis acoustic processing chambers. At certain temperatures, strong wall resonances were generated within the processing chamber itself and these transverse resonances were thought sufficient to disrupt the levitation well. These wall resonances are apparently not strong enough to cause instabilities in the levitation well.

N80-32220/9 PC **A02**/MF **A01**
Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Laser Doppler Velocimetry: Principles, Potential and Examples of Possible Applications.
M. L. Riethmuller. Feb 79, 9p VKI-PREPRINT-1979-6
Submitted for Publication. Presented at Neth. Soc. For Photonics Conf. On Properties and Appl. Of Laser Radiation II, Delft, 18-20 Apr. 1979.

The working principles and applications examples of the laser Doppler velocimeter are presented. Advanced systems permitting multidimensional simultaneous measurement are mentioned. The examples presented include supersonic flow measurements, free surface velocity measurement in rheological flows, and velocity profile measurements inside the gelatin layer of a photosensitive film.

PATENT-4 196 417
Not available NTIS
Department of Energy, Washington, DC.
Single Transmission Line Interrogated Multiple Channel Data Acquisition System.
Patent,
G. E. Fasching, and T. W. Keech, Jr. Filed 23 Nov 77, patented 1 Apr 80, 20p PAT-APPL-854 444
Supersedes PAT-APPL-854 444-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A single transmission line interrogated multiple channel data acquisition system is provided in which a plurality of remote station/sensor circuits each monitors a specific process variable and each transmits measurement values over a single transmission line to a master interrogating station when addressed by said master interrogating station. Typically, as many as 330 remote stations may be parallel connected to the transmission line which may exceed 7000 feet. The interrogation rate is typically 330 stations/second. The master interrogating station samples each station according to a shared, charging transmit-receive cycle. All remote station address signals, all data signals from the remote stations/sensors and all power for all of the remote station/sensors are transmitted via a single continuous terminated coaxial cable. A means is provided for periodically and remotely calibrating all remote sensors for zero and span. A provision is available to remotely disconnect any selected sensor station from the main transmission line. (ERA citation 05:034456)

PATENT-4 201 692
Not available NTIS
Department of Energy, Washington, DC.
Gas Mixtures for Gas-Filled Particle Detectors.
Patent,
L. G. Christophorou, D. L. McCorkle, D. V. Maxey, and J. G. Carter. Filed 22 Jan 79, patented 6 May 80, 4p PAT-APPL-6-005 263
Supersedes PAT-APPL-6-005 263.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Improved binary and tertiary gas mixtures for gas-filled particle detectors are provided. The components are chosen on the basis of the principle that the first component is one gas or mixture of two gases having a large electron scattering cross section at energies of about 0.5 eV and higher, and the second component is a gas (Ar) having a very small cross section at and below aout 0.5 eV, whereby fast electrons in the gaseous mixture are slowed into the energy range of about 0.5 eV where the cross section for the mixture is small and hence the electron mean free path is large. The reduction in both the cross section and the electron energy results in an increase in the drift velocity of the electrons in the gas mixtures over that for the separate components for a range of E/P (pressure-reduced electron field) values. Several gas mixtures are provided that provide faster response in gas-filled detectors for convenient E/P ranges as compared with conventional gas mixtures. (ERA citation 05:032731)

PB81-104374 Not available NTIS
National Bureau of Standards, Washington, DC.
Study of the Dependence of Frequency Upon Microwave Power of Wall-Coated and Buffer-Gas-Filled Passive Rb78 Frequency Standards.
Final rept.,
A. Risley, and S. Jarvis, Jr. 1979, 7p
Pub. in Proc. Annual Frequency Control Symposium (32nd), Atlantic City, NJ., May 3-June 1, 1979 p477-483 1979.

Previous studies of a commercial passive-gas-cell 87Rb frequency standard showed a strong dependence of the output frequency, upon the microwave power. A major conclusion of that work was that the dependence of output frequency upon microwave power was due to a line inhomogeneity effect. The line inhomogeneity interpretation suggested that substituting a wall coating for the usual buffer gas would reduce the dependence upon microwave power. As a part of the present work a wall coating (a form of paraffin) was used and a reduction of this dependence by a factor of 100 was obtained. The present work has led to a more convincing theoretical demonstration of the line inhomogeneity effect. The paper discusses some of the details of the analytical procedure. There are certain major requirements that a wall coating would have to satisfy if it were to be superior to the usual buffer gas and these are discussed in the text. The advantages demonstrated by the present work indicate that further studies are warranted to determine if an improved standard could be built based on a wall coating.

PB81-104408 Not available NTIS
National Bureau of Standards, Washington, DC.
Guidelines for Metric Training and the Transitional Period.
Final rept.,
H. J. Milton. May 80, 10p
Pub. in AIA Metric Building and Construction Guide, ch10 p91-100 May 1980.

The chapter deals with two aspects of metrication: the training of people in the construction community, and technical adaptation during the transition period. Formal metric training programs are contrasted with informal familiarization outside and within the work environment. Training needs of various groups and the scope for construction industry metric training programs are discussed. The value of metric recognition points and mental images as part of the familiarization program is stressed and some typical examples are given. Strategies are offered for the technical adaptation of materials and components during the transitional phase, both for design and construction. A matrix shows various degrees of complexity of adaptation, ranging from negligible (no or minimal change) to costly and practically impossible, and recommends courses of adaptive action for designers and contractors. The impact of metrification in relation to existing buildings and their maintenance, repair, rehabilitation, extensions and additions is examined and various strategies for the minimization of costs and problems are recommended. Legal and contractual implications of the change are addressed.

PB81-104432
National Bureau of Standards, Washington, DC.
Some Implications of Reciprocity for Two-Way Clock Synchronization.
Final rept.,
J. L. Jespersen. 1979, 14p
Pub. in Proc. Annual Precise Time and Time Interval (PTTI) Applications and Planning Meeting (11th), Goddard Space Flight Center, Greenbelt, MD., Nov 27-29, 1979 p171-184 1979.

Two common methods for synchronizing remote clocks are called one-way and two-way. Both of these methods, when operated in the traditional fashion are subject to a number of difficulties related to propagation perturbances. This paper points out however, that under certain circumstances, these difficulties can be circumvented for the two-way scheme. This possibility is explored theoretically, in some detail, with respect to the Loran-C navigation system.

PB81-104440 Not available NTIS
National Bureau of Standards, Washington, DC.
Voice Announcements of Time: A New Approach.
Final rept.,
J. Jespersen, G. Kamas, and M. Weiss. 1979, 22p
Pub. in Proc. Annual Precise Time and Time Interval (PTTI) Applications and Planning Meeting (11th), Goddard Space Flight Center, Greenbelt, MD., Nov 27-29, 1979 p363-384 1979.

A recent survey by NBS reveals that the voice time announcements provided by radio stations WWV and WWVH are used more often than any other features of the time signals. It is the purpose of this paper to describe some recent NBS work aimed at exploring a different technique for generating voice time announcements.

PB81-104465 Not available NTIS
National Bureau of Standards, Washington, DC.
Time Recovery Measurements Using Operational GOES and Transit Satellites.
Final rept.,
R. E. Beehler, D. D. Davis, J. V. Cateora, A. J. Clements, and J. A. Barnes. 1979, 30p

Pub. in Proc. Annual Precise Time and Time Interval (PTTI) Applications and Planning Meeting (11th), Goddard Space Flight Center, Greenbelt, MD., Nov 27-29, 1979 p282-312 1979.

Results of regular monitoring of both the GOES and TRANSIT timing signals over a number of months at NBS, Boulder, CO are presented. The TRANSIT results include an analysis of how received timing accuracy and stability are affected by: (1) averaging over varying numbers of satellite passes; (2) averaging over different combinations of the 5 available satellites; (3) using several independent receivers of the same type; and (4) application of (TRANSIT-UTC(USNO)) published corrections to the received data. Based on monitoring experience to date at NBS, some pros and cons of using each of the available operational systems are discussed. Updated information on recent improvements incorporated into the GOES time code generation and monitoring system at Wallops Island, VA is also included.

PB81-104481 Not available NTIS
National Bureau of Standards, Washington, DC.
Two-Way Time Transfer via Geostationary Satellites. NRC/NBS, NRC/USNO and NBS/USNO via Hermes and NRC/LPTF (France) via Symphonie.
Final rept.,
C. C. Costain, J.-S. Boulanger, H. Daams, W. J. Klepczynski, and L. Veenstra. 1979, 21p
Pub. in Proc. of Annual Precise Time and Time Interval (PTTI) Applications and Planning Meeting (11th), Goddard Space Flight Center, Greenbelt, MD., Nov 27-29, 1979, p499-519 1979.

The two-way time transfer using the Hermes (CTS) satellite and the Symphonie satellite began in July, 1978. The Hermes experiment finished at the end of June 1979, and the Symphonie experiment will continue until the end of 1980. The N.R.C. uses terminals at the Communication Research Center about 25 miles from the N.R.C. laboratory, and the time transfer from N.R.C. to C.R.C. is made using line of sight IV reception with frequency checks by portable cesium or rubidium clocks. Initially the USNO used Goddard terminals, and the NBS a HEW terminal in Denver, and both relied primarily on portable clock synchronization. For the last eight months, Comsat terminals were used at the USNO and at NBS, so that no secondary time transfer was required. In France, the PBS Symphonie terminal is in Brittany, 300 miles from the Laboratoire de Temps et Frequence (LPTF) at the Observatoire de Paris, and the time transfer to the terminal is made via the TV networks. The uncertainty in this latter link is about 20 ns, but for the other stations the uncertainty is 1 to 5 ns.

PB81-104630 PC **A02**/MF **A01**
Bureau of Mines, Amarillo, TX. Helium Operations.
A Proportional Temperature Controller with Automatic Shutoff.
Rept. of investigations 1980,
George M. Lucich, and Philip W. Holland. 1980, 14p BUMINES-RI-8423

This report describes a sensitive, proportional temperature controller developed by the Bureau of Mines that is useful in the temperature range from 40 to 400C with an accuracy of plus or minus 0.1C. A temperature controller of this kind is potentially useful for regulating temperatures in air chambers, liquid baths, furnaces, and reaction vessels, and for other applications. This instrument was developed to control the duration and temperature of the heating cycle of a charcoal-filled adsorber that is part of a special helium analyzer used by the Bureau. The controller was made from commercially available parts, and can be easily modified to provide continuous temperature control. The circuit is solid-state and employs no electromechanical devices. Over a 2-year period of use as a component of the special helium analyzer, this temperature controller performed successfully and required no maintenance.

PB81-106577
(Order as PB81-106536, PC **A05**/MF **A01**)
National Bureau of Standards, Washington, DC. National Engineering Lab.
Design Aspects of Scheffe's Calibration Theory Using Linear Splines.
C. H. Spiegelman, and W. J. Studden. 30 Jan 80, 11p
Prepared in cooperation with Purdue Univ., Lafayette, IN. Dept. of Statistics.
Included in Jnl. of Research of the National Bureau of Standards, v85 n4 p295-304 Jul Aug 80.

The measurement process uncertainty is propagated through the use of a calibration curve. The magnitude and direction of this uncertainty depends on the choice of the controllable variable in producing the calibration curve; in other words, the design of the calibration experiment. In this paper this design is discussedin the context of Scheffe's approach to the uncertainties of a calibration curve and in particular for the case in which the calibration curve is a linear spline. A class of appropriate designs is given, which depend on the location of the knots and the slopes of the segments. One of these uesigns is quickly calculable and can be found without a computer. Based on these results, a design approach is suggested for the case in which the knots are not known exactly.

PB81-108516 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Catalog of Federal Metrology and Calibration Capabilities (1980 Edition).
Final rept.,
Kathryn O. Leedy. Sep 80, 74p NBS-SP-546
Supersedes PB-297 151. Library of Congress catalog card no. 80-600149.

This publication lists Federal laboratories involved in metrology and calibration. Included is the name of a person at each laboratory to contact for more information as well as the laboratory telephone number and address. The capabilities of each laboratory are indicated in a tabular listing by agency. To provide geographical distribution, the laboratories are listed by States. In addition, the laboratories are shown on a map by coded number. Other references are described.

PB81-109209 PC **A02**/MF **A01**
National Bureau of Standards, Boulder, CO. National Engineering Lab.
Evaluation of Three-Terminal and Four-Terminal Pair Capacitors at High Frequencies.
Technical note,
R. N. Jones. Sep 80, 22p NBS-TN-1024

The low frequency (1 kHz) capacitance values of three-terminal and four-terminal pair air dielectric capacitors can be extrapolated to higher frequencies if the residual series inductance is known. A resonance method for evaluating the residual series inductance of these capacitor types, together with the extrapolation procedure, is described. For the region where the product of capacitance in farads and frequency in hertz is 0.01 or less, uncertainties of one percent or less may be obtained.

PB81-109597 PC **A06**/MF **A01**
Raytheon Service Co., Burlington, MA.
Optimizing Calibration Recall Intervals and Algorithms.
Final rept.
12 Aug 80, 112p NBS-GCR-80-283
Contract NB79-SBCA-0061
See also PB81-110181.

This report describes methods currently used for establishing and/or adjusting calibration intervals within the Federal government and private industry. Each interval method is analyzed in some detail and recommendations of feasibility for use are presented. Data for the report were gathered from visits to 23 government and industry calibration laboratories and survey questionnaires received from 51 representative calibration labs in the Federal government.

PB81-110181 PC **A05**/MF **A01**
Raytheon Service Co., Burlington, MA.
Alternatives to PMTE (Precision Measuring and Test Equipment) Out-Of-Service Calibrations.
Final rept.
12 Aug 80, 98p NBS-GCR-80-282
Contract NB79-SBCA-0061
See also PB81-109597.

This report describes various alternatives to out-of-service calibration within the Federal government and private industry. Current calibration practices and recommendations for improvement are presented. Findings and recommendations are based on data gathered from visits to 23 government and industry calibration laboratories and survey questionnaires received from 51 representative calibration labs in the Federal government.

TU-Inf-05-06-79 PC **A02**/MF **A01**
Technische Univ., Dresden (German D.R.). Sektion Physik.
CAMAC Module 'Preadjustable Forward-Backward Counter'.
U. Meyer, and F. Weidhase. 1979, 20p
In German.
U.S. Sales Only.

Design, operation, and application of the CAMAC module 1170 are described. This description includes a compilation of technical data and a CAMAC data sheet. The following examples of application to pulse-dependent control tasks are given: Digital positioning control, beam positioning control, measuring time control, pulse frequency comparison. (Atomindex citation 11:511469)

14D. Reliability

AD-A089 677/9 PC **A03**/MF **A01**
Boeing Aerospace Co Seattle WA
Hardness Assured Device Specifications.
Final technical rept. Oct 78-Oct 79,
C. J. Dixon, and F. B. McGalliard. May 80, 50p
RADC-TR-80-104
Contract F30602-78-C-0325

A proposed hardness assured device specification plan was prepared describing the tasks required to develop hardness assured device specifications and qualify parts within the existing military specification system. The activities required to prepare the specifications is described in the plan. The final report discussed the decisions made in preparing the plan, describes the cost savings from implementing the plan and includes the required changes to MIL-M-38510 MIL-M-19500 and MIL-STD-883 to be compatible with the proposed detail specifications. A unique approach to specifying hardness assurance parameters was developed to permit only two hardness levels to satisfy all anticipated users. Variables percent defective statistical test methods are described which reduce the cost of testing. (Author)

14E. Reprography

N80-31857/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Raduga Experiment: Multizonal Photographing the Earth from the Soyuz-22 Spacecraft.
Y. Ziman, Y. Chesnokov, B. Dunayev, V. Aksenov, and V. Bykovskiy. Jul 80, 27p NASA-TM-76234, D-254
Contract NASW-3198
Transl. Into English of "Eksperiment Raduga--Mnogozonal Noye Fotografirovan Ye Zemli S Kosmicheskogo Korablya Soyuza-22" Rept D-254 Acad. Of Sci. USSR, Inst. Of Space Res., Moscow, 1977 p 1-35. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The main results of the scientific research and 'Raduga' experiment are reported. Technical parameters are presented for the MKF-6 camera and the MSP-4 projector. Characteristics of the obtained materials and certain results of their processing are reported.

PB81-103301 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. Law Enforcement Standards Lab.

Selection and Application Guide to Police Photographic Equipment,
Charles C. Grover. Aug 80, 68p NBS-SP-480-23
Sponsored in part by National Inst. of Law Enforcement and Criminal Justice, Washington, DC. Prepared in cooperation with Naval Surface Weapons Center White Oak Lab., Silver Spring, MD.

This user guide provides a basis for the selection of photographic equipment that meets the needs of law enforcement. Typical police photographic assignments are discussed to identify those aspects of the tasks that influence equipment needs. Each of the available types of cameras is described, including operation, required operator skill, advantages and disadvantages. Lenses, film, lighting equipment, filters, exposure meters and other accessories are also discussed.

15. MILITARY SCIENCES

15A. Antisubmarine Warfare

AD-A089 275/2 PC **A03**/MF **A01**
Army War Coll Carlisle Barracks PA
Ultra and the Campaign Against the U-Boats in World War II.
Study project rept.,
Jerry C. Russell. 20 May 80, 45p

The problem addressed is the extent to which the United States Navy used Ultra, or Special Intelligence, in the campaign against the German U-boats. Information was gathered through published and unpublished sources. Through a chronological approach, United States Navy involvement is traced from entry into the war until its conclusion. Many factors are involved in the final outcome of the war and Ultra is only one. The Battle of the Atlantic was long and gruesome rather than short and spectacular. The United States Navy used Ultra along with technology, tactics, brilliant leadership and courageous men at sea to win the Battle of the Atlantic in World War II. The lessons for the future are clear. If the United States intends to oppose the Soviet submarine force at sea anywhere in the world, then we must maintain the lead in intelligence, tactics and technology. Further, and most importantly, we must strive to regain superiority of forces in those ocean areas where our interests are at stake. (Author)

15B. Chemical, Biological, and Radiological Warfare

AD-A089 309/9 PC **A07**/MF **A01**
Letterman Army Inst of Research San Francisco CA
Shower Decontamination Efficacy-In Vitro Determinations.
Final rept. for period ending 15 Oct 79,
William G. Reifenrath. Aug 80, 129p Rept no. LAIR-86

A decontamination bench model has been used to assess quantitatively the importance of several variables (water pressure, Triton X-100 concentration, water temperature, nozzle type, and shower time) on decontamination of nontoxic radiolabeled agent simulants diethyl malonate and thickened diethyl malonate from pig skin in vitro. The force per unit area exerted by the water on the skin (water pressure) had the greatest impact on decontamination efficiency. Decontamination solution temperature and the presence of Triton X-100 did not greatly influence decontamination efficiency. Percutaneous penetration of the simulants was increased with showering; the significance of this finding will not be known until comparative permeability studies with diethyl malonate, thickened diethyl malonate, soman, and thickened soman are completed. (Author)

15C. Defense

AD-A089 167/1 PC **A03**/MF **A01**
Army Concepts Analysis Agency Bethesda MD
Study for Improving the Definition of the Army Objective Force Methodology (IDOFOR). Volume I. Executive Summary.
Final study rept. Aug 79-Jul 80,
James H. Malley. 31 Jul 80, 43p Rept no. CAA-SR-80-9-VOL-1

This study provides the Army with an improved methodology to support the exercise of its planning responsibilities within the PPBS. Developed an analytical basis for the design and evaluation of the Army objective force, 10-12 years in the future; provides an interface between mid-range and long-range planning; and has the capability to analyze a designated force from the program force to the planning force. Identifies and quantifies factors that determine reasonable attainability and reasonable assurance. (Author)

AD-A089 190/3 PC **A07**/MF **A01**
BDM Corp Albuquerque NM
Early Development of TNF S2 Test Capability.
Final rept. Apr-Nov 78,
G. L. Brown, R. V. Hovland, K. S. Redus, and F. Trujillo. 26 Dec 78, 143p BDM/TAC-78-545-TR, DNA-4799F, AD-E300 910
Contract DNA001-78-C-0245

This report addresses results derived in the early development of an operational test capability to support the Theater Nuclear Force Survivability and Security (TNF S2) program. The framework for program test and evaluation planning activities is presented. Identification of related test programs for supporting the TNF S2 program are discussed. A generic data management system is defined. Test support facilities for execution of the program are identified and discussed. (Author)

AD-A089 206/7 PC **A10**/MF **A01**
Center for Planning and Research Inc Palo Alto CA
Key Economic Problems and Guidelines for Crisis Relocation.
Final rept.,
Richard Laurino, Frank Trinkl, and Francis Dresch. Jun 80, 205p
Contract DCPA01-78-C-0227

This report, the third in a series on economic problems of crisis relocation, presents a detailed analysis of the post-crisis impact of crisis relocation on the economy in general, and on business and financial institutions in particular. The analysis includes results obtained with TEMCRIS II, an econometric model that predicts aggregate economic effects on a quarterly basis for the first year after peaceful resolution of the crisis. Another product of this report is a series of guidelines and sample planning formats for use by the federal government and by businesses and financial institutions in planning for the CR option. (Author)

AD-A089 212/5 PC **A11**/MF **A01**
Far West Lab for Educational Research and Development San Francisco CA
Models of Shelter Management Training and Delivery Systems.
Final rept. 2 Apr 79-31 May 80,
John W. Thomas, Diana P. Studebaker, joyce C. Hecht, and Bela H. Banathy. 31 May 80, 232p
Contract DCPA01-79-C-0248

The report presents two models: a model of a shelter management training system and a model of a delivery system for that training system. The project was to design procedures and arrangements that would provide for the training of 30,000 managers of congregate care facilities and fallout shelters during various time periods including peacetime. The report presents a number of related analyses intended as input to model building efforts. For the training model, audience characteristics, the shelter environment, areas of responsibility, and instructional management considerations are examined and converted into a set of considerations and options. Three training configurations are then developed based on three training scenarios. For the design of the delivery system, prerequisites and requirements are described and delivery components are defined. The viability of two candidate delivery agencies is then assessed with reference to system requirements and a number of organizational dimensions. Finally, optimal delivery strategies are described based on a combination of the capabilities of the two agencies.

AD-A089 255/4 PC **A02**/MF **A01**
Princeton Univ NJ
ROTC: The Universities' Stake in National Defense,
John W. Bitner. 10 Apr 70, 3p

No abstract available.

AD-A089 287/7 PC **A04**/MF **A01**
Analytics Inc Willow Grove PA
A Generalized Automated Decision Algorithm for the AEW Engagement/Intercept Planning Function.
Final rept.,
Julie Hopson, Steve Stark, Dave Detwiler, Wayne Zachary, and Steve Fitzkee. 15 Jul 80, 59p
NADC-80104-50
Contract N62269-79-C-0235

This document describes a generalized automated decision algorithm for the Engagement/Intercept Planning Function of an AEW (Airborne Early Warning) aircraft in the post-1985 time frame. Structure of the automated algorithm was based upon an analysis of the decision situation which included identification of relevant decision processes and required data inputs/outputs in order to allocate man/machine functions. Individual decision processes were categorized and matched to appropriate modeling techniques which were integrated into a complex algorithmic network to automate major functions of the Engagement/Intercept Plan. (Author)

AD-A089 421/2 PC **A03**/MF **A01**
Army War Coll Carlisle Barracks PA
Hypermodernization for the Twenty-First Century: The Vital Step beyond Modernization for the 1980s.
Study project rept.,
David S. Jackson. 15 May 80, 39p

The purpose of this study is to investigate the methods by which the Army may move beyond its current modernization effort in order to meet the challenges of changing technology and related doctrine--changes we are certain to face in the decades which open the twenty-first century. The methodology was a simple synthesis of ideas gleaned from three sources: (1) personal research; (2) lectures and classes at the US Army War College; and (3) interviews conducted at several research institutions. (Author)

AD-A089 530/0 PC **A05**/MF **A01**
Army Command and General Staff Coll Fort Leavenworth KS
Requirements and Capabilities of the Land Force Commander for Timely Intelligence in a Hostile Air Defense Environment.
Master's thesis,
James Taylor Thomes. 1974, 76p AD-E750 002

This thesis examines the requirements of the land force commander for timely intelligence of the battlefield when engaged in combat operations with a highly mobile enemy. The capabilities of the organic Army agencies and USAF Tactical Reconnaissance forces are addressed in light of a typical enemy maneuver and air defense environment. The thesis is UNCLASSIFIED. The theoretical capabilities of the enemy have been extracted from Field Manuals 102 and 103, relating to Aggressor, The Maneuver Enemy, the characteristics of whom are used by the U.S. Army in training exercises. Characteristics of all the systems available to the

land force commander were extracted from unclassified Field Manuals, pamphlets, and recently declassified test reports. General conclusions reveal that: (1) the commander will not be capable of acquiring timely order of battle and target acquisition intelligence throughout most of his areas of interest and influence. (2) intelligence derived through existing Tactical Reconnaissance procedures will not be sufficiently timely to meet the requirements of a typical tactical situation. (3) developmental USAF capabilities for timely surveillance/reconnaissance could be sufficient to collect and process tactical information, and the US Army Battlefield Information Control Center could be sufficient to produce timely intelligence, provided the two capabilities were integrated. (author)

15D. Intelligence

AD-A089 386/7 PC **A03**/MF **A01**
RAND Corp Santa Monica CA
Network Structures for Distributed Situation Assessment.
Interim rept.,
R. Wesson, Frederick Hayes-Roth, J. Burge, C. Stasz, and C. Sunshine. Aug 80, 48p Rept no. RAND/R-2560-ARPA
Contract MDA903-78-C-0029, ARPA Order-3460

This report investigates potential organizations for automated distributed sensor networks (DSN's), i.e., dispersed nodes that can pool their information to perform accurate situation assessment. Laboratory experiments using a message puzzle task indicate that an 'anarchic committee' organization, in which all nodes communicate with one another, consistently outperforms the 'dynamic hierarchical cone' organization, in which communications is constrained and information must be obtained only from lower-level nodes. These experiments support the contention that DSNs must emphasize cooperative problem-solving rather than problem reduction or subgoaling. A computer-based design that minimizes redundant communications in hierarchical organizations by using model-based reasoning to form expectations that guide, limit, and reduce reporting frequency is described. Finally, a method for representing hypotheses to minimize communication requirements--the process assembly network--is suggested. This concept uses active 'hypotheses processes' that are responsible for predicting their own evolution over time.

15E. Logistics

AD-A089 184/6 PC **A05**/MF **A01**
Hayya (Jack C) Associates State College PA
Leadtime Variability In Inventory Requirement Projections.
Final technical rept. 30 Aug 79-30 Jun 80 on Phase 3,
Jack C. Hayya. 30 Jun 80, 77p
Contract F33615-79-C-5143

The Air Force has experienced inventory support problems apparently because of Leadtime Variability. This study was to find out whether Leadtime Variability had a significant influence on safety stocks. The researcher fitted different distributions to Leadtime data of High-Intensity items and found the data to fit the laplace distribution. Previous work provide an optimization model for the distribution. Use of this model can raise the average service level significantly. Cost of conversion for AFLC is estimated at a onetime expense of $150 million and annual operating cost increase of $50 million.

AD-A089 272/9 PC **A02**/MF **A01**
Air Force Business Research Management Center Wright-Patterson AFB OH
An Analysis and Evaluation of Use of Economic Theory in Aircraft Engine Repair-Discard Decisions.
Final rept.,
Waldon R. Kerns. Nov 78, 23p

this staff study report is an analysis and evaluation of the applicability of economic theory to aircraft engine and accessories repair-discard decisions. The study is based upon an extensive review of the ERRC (expendability, recoverability, and repairability category) coding system and CIP (component improvement program) system at the Oklahoma City Air Logistics Center. The basic implication is that present repair-discard decisions do not account for higher costs and production delays in the future because of shortages of critical materials. Accounting for this factor could change a discard decision to repair resulting in dollar savings and better field support for engines and accessories. (Author)

AD-A089 320/6 MF **A01**
Logistics Studies Office (ALMC) Fort Lee VA
Analysis of Major Item Redistribution/Substitution Policies. Volume II.
Final rept.,
Uldis Rex Poskus. May 80, 204p
Availability: Microfiche copies only.

This is a second volume of a two-part report. The listings of substitute items shown in this volume are arranged by authorized Line Item Number (LIN) in ascending order. Appendix A segregates the total substitutes by manager code and contains 12 sections. Appendix B is a complete listing of substitutes arranged by authorized LIN in ascending order. (Author)

AD-A089 327/1 PC **A08**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
An Analysis of Reports of Item Shipment Discrepancies Submitted and Processed by Selected Department of Defense Agencies.
Master's thesis,
Forrest E. Smith, and Monrak Saengaram. Jun 80, 172p Rept no. AFIT-LSSR-55-80

This thesis deals with item shipment discrepancy reports submitted by receiving activities on a Standard Form 364, Report of Item Discrepancy (ROID). The specific questions addressed concern the timely submission and usefulness of the report. The research consists of three parts. The first part examines the time it takes to process a report. The second part deals with identifying the major types of item shipment discrepancies. The final portion addresses the usefulness of the report in determining the underlying causes and the corrective actions taken as a result of the report. Recommendations made are designed to alleviate the shortcomings of the current program to enable the various shipping activities to be more responsive to the problems encountered by the customer. The information analyzed consists of data from four Air Force bases and the Defense Electronics Supply Center. (Author)

AD-A089 333/9 PC **A11**/MF **A01**
SRI International Menlo Park CA
Advanced Naval Supply Base Cost Model (ABCOMO).
Final rept. Jan 78-Apr 80,
R. H. Monahan, and W. Schubert. Apr 78, 229p
Contract N00014-78-C-0138

This report describes a computerized model that provides estimates of the resources required to construct and operate an advanced permanent naval supply base to support Navy and Marine forces in overseas areas of operations over prolonged periods of time. The model determines the necessary facilities, personnel, and equipment required for such a base, including estimates of the initial investment and recurring annual costs to construct and operate the base. In addition to providing a detailed mathematical description of the model, the report also describes the mechanics of setting up a model run, using a realistic sample problem for illustrative purposes. A complete listing of the program is included as an appendix to the report. (Author)

AD-A089 344/6 PC **A04**/MF **A01**
System Development Corp McLean VA
Authentication Devices and Procedures.
Final rept.,
John M. Vasak. 29 Aug 80, 61p Rept no. SDC-TM-WD-7999/401/00
Contract N00173-78-C-0455

This paper contains summary descriptions and analysis of authentication devices, procedures, and technologies. Also included are performance comparisons, relative costs, and current areas of research and development. Special emphasis and study is placed on passwords, card systems, and identity verification devices since they are the primary instruments used to provide identification in access control schemes. Finally, recommendations are made for authentication procedures to be used in the Navy Supply System to help alleviate both current and potential problems related to user identification. This report was prepared under contract N00173-78-C-0455, Task No. 10 for the Navy Ship Research and Development Center (NSRDC) for use in the Navy Supply environment. (Author)

AD-A089 345/3 PC **A05**/MF **A01**
System Development Corp McLean VA
Auditing Study Report.
Final rept.,
Broadus King. 29 Aug 80, 92p Rept no. SDC-TM-WD-7999/400/01
Contract N00173-78-C-0455

The purpose of this study was to review the state-of-the-art of auditing and control techniques applied to computerized information systems, particularly large-scale logistics information systems, and to present the findings as a basis for planning and organizing a research and development effort covering real-time software auditing and conventional process auditing of logistics information systems. The basic problem motivating this study is undue depletion of government assets caused by gross inefficiencies resulting from erroneous computerized recordkeeping, by assets being misappropriated through possible misuse of the computer, or by some combination of the two. The erroneous processing results may be caused by a combination of varied deficiencies, including incorrect input processing and latent computer program faults. The objective of the auditing techniques under discussion in this report is to determine, on an ongoing basis, whether system controls are operating effectively to detect, deter, prevent or correct erroneous processing results -- whether from hardware failure, software deficiencies, inadvertent error, or intentional misuse.

AD-A089 346/1 PC **A03**/MF **A01**
System Development Corp McLean VA
A Comparison of Risk Assessment Methodologies.
Final rept.,
H. Stephen Morse. 30 Jun 80, 45p Rept no. SDC-TM-WD-7999/202/00
Contract N00173-78-C-0455

This document contains a comparison of five Risk Assessment Methodologies. They are: FIPS 65; the Air Force RAMP; Chapter 6 of the DoA ADP Handbook; the AFIPS Self-Audit Checklist; and the RAM developed by SDC for the Navy. These methodologies are compared on a number of criteria including theoretical soundness, level of effort required, ease of use, completeness of instructions, use and reliability of quantitative metrics, and appropriateness for use by the Department of the Navy. (Author)

AD-A089 394/1 PC **A15**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
A Foundation for an International Logistics Language.
Master's thesis,
Husam K. Abo Ghazaleh, and Ardel E. Nelson. Jun 80, 345p Rept no. AFIT-LSSR-44-80

The need for unambiguous communication among all nations is critical in the world today. In the field of Foreign Military Sales this need is most prevalent in the development of support documents, from FMS Procedure Manuals to Technical Orders, that must be clearly understood by both the United States and the allied nations. Experience has shown that narrative English is not meeting this need. This thesis demonstrates a better way to write International Logistics Documents. Actual logistics documents were used as the basis

for testing. United States and allied personnel (representing over twelve countries) assisted in obtaining the thesis conclusions. (Author)

AD-A089 395/8 PC **A09**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
Feasibility of Direct Funding as an Alternative to the Current DoD Calibration Funding Methods.
Master's thesis,
David R. Baker, and Danny C. Rehm. Jun 80, 184p Rept no. AFIT-LSSR-60-80

A great amount of emphasis is being placed upon increased interservice calibration support and consolidation of duplicative calibration facilities and capabilities. This thesis examines the concept of directly funding the Army, Navy, and Air Force Metrology and Calibration Programs, from a single line item in the DOD Budget, in order to enhance interservice support and consolidation in the area of Metrology. Information gathered which formed the basis for this thesis was obtained through personal and telephone interviews with key people located throughout the operational spectrum of the three Services' Metrology and Calibration Programs. This thesis concludes that direct funding of these programs is not feasible without the establishment of a single DOD manager for Metrology and Calibration primarily because of the differences in the management structure of the three programs and the difficulty in allocating scarce resources between the Services. (Author)

AD-A089 397/4 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
Macro Aircraft Spares Readiness Analysis.
Master's thesis,
Charles Middleton, Nazar Muhammad, and Ronald C. Wilson. Jun 80, 123p Rept no. AFIT-LSSR-56-80

This thesis presents an aircraft weapon system spares support model for determining the number of days of contingency operations which are supportable. Contingency spares support is of paramount concern to Air Force readiness. The translation of current or predicted inventory positions into meaningful measures of military capability is crucial to both operational and logistics planning. Currently the Air Force has no management information system which can accurately assess spares support for its deployed weapon systems. The authors have developed a practical interim planning structure and preliminary decision support model which provides for mid to long-range (i.e., 3-10 years) spares readiness assessment. It is further demonstrated how a more comprehensive system can be developed for immediate, short-range assessments in support of contingency deployments. (Author)

AD-A089 425/3 PC **A03**/MF **A01**
Logistics Studies Office (ALMC) Fort Lee VA
Analysis of Major Item Redistribution/Substitution Policies. Volume I.
Final rept.,
Uldis Rex Poskus. May 80, 44p

The prevalent utilization of substituted major items for authorized major items requires that the management of these substitutes be improved throughout DARCOM. This report investigates four primary areas of interest to HQ DARCOM: the cost of redistributing existing substitutes, the rationale for substituting non-type classified items for authorized items, a policy for within-LIN substitutions, and the feasibility of loaning rather than issuing substitute items. Various side aspects of substitution are also investigated. Recommendations are proposed. (Author)

AD-A089 622/5 MF **A01**
Office of Naval Research Arlington VA
Naval Research Logistics Quarterly, Volume 27, Number 3.
Sep 80, 182p
Availability: Superintendent of Documents, GPO, Washington, DC 20402 Annual Rate $11.15 Microfiche furnished to DTIC (and NTIS) users.

Partial contents: On the Reliability, Availability and Bayes Confidence Intervals for Multicomponent Systems; Optimal Replacement of Parts Having Observable Correlated Stages of Deterioration; Statistical Analysis of a Conventional Fuze Timer; The Asymptotic Sufficiency of Sparse Order Statistics in Tests of Fit with Nuisance Parameters; On a Class of Nash-Solvable Bimatrix Games and Some Related Nash Subsets; Optimality Conditions for Convex Semi-Infinite Programming Problems; Solving Incremental Quantity Discounted Transportation Problems by Vertex Ranking; Auxiliary Procedures for Solving Long Transportation Problems; On the Generation of Deep Disjunctive Cutting Planes; The Role of Internal Storage Capacity in Fixed Cycle Production Systems; Scheduling Coupled Tasks; Sequencing Independent Jobs with a Single Resource; and Evaluation of Force Structures under Uncertainty.

AD-A089 653/0 PC **A03**/MF **A01**
Air Force Logistics Command Wright-Patterson AFB OH
Cost Effective Termination Policies D062 - Economic Order Quantity (EOQ) Items,
Carol Hawks. Jul 80, 33p

This study of termination policies is the result of a GAO audit report that claims the current Air Force policy results in permissive overstockage. Simulation of the EOQ system is used to show the need for a buffer zone before termination notices are generated. It also demonstrates that when a termination notice is generated, it is better to adjust the purchase request so that the inventory position equals the requirements objective than it is to cancel the entire purchase request. Although the simulation shows that the Army, Air Force and DLA policies are all more cost effective than the GAO recommendation, the results did not prove that any services policy was more cost effective than the others. Thus, the final recommendation is that the Air Force should continue to use its current policies to generate termination notices. Also the Air Force should handle termination notices by adjusting the purchase request so the inventory position equals the requirements objective. This is a change from their current policy of adjusting the purchase request so the inventory position equals the termination level. (Author)

AD-A089 654/8 PC **A03**/MF **A01**
Air Force Logistics Command Wright-Patterson AFB OH
EOQ Holding Cost Evaluation.
Final rept.,
Carol Hawks. Sep 79, 41p

The primary purpose of the holding cost study was to build a reference chart of the effect on purchases and support statistics for use when the holding cost changed. The relationship between holding cost and ordering cost in the EOQ formula allows this chart to also be utilized when the ordering cost changes. A secondary result of the study was charts showing the relationship between holding cost, shortage cost and buy dollars or backorders or fill rates. EOQ holding cost varies from ALC to ALC. Each year these holding costs are updated and can change. As they change questions arise as to what will happen to buy dollars, fill rates, backorders and number of purchases. This study simulated samples of items through a period of time using several holding costs. Comparison of the resultant buy dollars, fill rates, backorders and number of purchases showed the effect of changing the holding cost. The magnitude of the effect varied depending on the initial holding cost. The tables included show this effect of changing the holding cost through a wide range of feasible holding costs. (Author)

15F. Nuclear Warfare

AD-A089 188/7 PC **A03**/MF **A01**
Boeing Aerospace Co Seattle WA
On-Board Aircraft Damage Assessment.
Final rept. 1 Jan-1 Sep 78,
E. N. York, and S. L. Strack. 1 Sep 78, 35p DNA-4725F, AD-E300 906
Contract DNA001-78-C-0138

The need for crews of strategic aircraft to assess in real time the damage to their aircraft in a nuclear encounter is evaluated. Current on-board sensors are shown to be inadequate and types of sensors are prepared to give on-board damage assessment capability. A plan is proposed to develop and test such sensors. (Author)

15G. Operations, Strategy, and Tactics

AD-A089 264/6 PC **A05**/MF **A01**
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
Evaluator Rating of Unit Performance in Field Exercises: A Multidimensional Scaling Analysis.
Interim technical rept.,
Steven M. Medlin, and Paul Thompson. Apr 80, 89p Rept no. ARI-TR-438

Statistical data analysis techniques were applied to expert judgments to explore systematic methods to incorporate expert military opinion into unit evaluation procedures. The research involved two related studies designed to define the major dimensions, or factors, that military judges use to assess unit performance in field exercises. In the first study, 15 military judges rated unit performance described in written narratives of 15 field exercises. These ratings were then analyzed using multidimensional scaling (MDS) techniques to determine how many dimensions the judges used to evaluate performance. The second study attempted to define, or label, the dimensions obtained in the first study. To do this, a list of possible dimension-defining attributes (adjectives or descriptive phrases) was composed, a new group of 30 military judges ranked the 15 narratives with respect to how much each narrative was characterized by the attributes, and these ratings were used as input to a second MDS analysis. The results indicated that judges used only three dimensions to evaluate unit performance, and that the dominant dimension was quality of overall performance. Subsequent interpretive analyses suggested that the weaker two dimensions were use of indirect fire and use of TOWs; when the dominant quality-of-performance dimension was eliminated, however, the secondary dimensions were (a) leadership functions, including coordination of elements, command and control, and exercise of leader functions, and (b) tactical skills, including use of indirect fire, quality of tactical plan, and use of tanks.

AD-A089 290/1 PC **A03**/MF **A01**
Naval Postgraduate School Monterey CA
The STAR FIELD Module.
Technical rept.,
James K. Hartman. Jun 80, 43p Rept no. NPS55-80-023

This report describes the FIELD module of the STAR combat simulation. The FIELD module is used to simulate minefields, obstacles, and other terrain related battlefield features. The FIELD routines are described and typical uses are discussed. (Author)

AD-A089 340/4 PC **A03**/MF **A01**
RAND Corp Santa Monica CA
NATO Inland Transport as a Potential Rear-Area Target System: Lessons from German Experience in World War II.
Interim rept.,
Edmund Dews. Jun 80, 35p Rept no. RAND/N-1522-PA/E
Contract MDA903-77-C-0107

Prepared as background material in support of a study of possible vulnerabilities in NATO's rear areas, this Note provides a brief analytical review of the results of World War II Allied air attacks against the German waterway and rail transportation systems. It describes the types of attacks against the waterways and railroads, summarizes their effects, and raises questions about present-day vulnerabilities to conventional air attacks. The Note is based mainly on the detailed reports of the United States Strategic Bombing Survey. (Author)

AD-A089 341/2 PC **A03**/MF **A01**
RAND Corp Santa Monica CA

POL Storage as a Target for Air Attack: Evidence from the World War II Allied Air Campaigns against Enemy Oil Installations.
Interim rept. May 44-Aug 45,
Edmund Dews. Jun 80, 30p Rept no. RAND/N-1523-PA/E
Contract MDA903-77-C-0107

Prepared as background material in support of a study of possible vulnerabilities in NATO's rear areas, this note provides a brief analytical review of the results of World War II allied air attacks against oil installations in Germany and Japan, with special reference to the damage done to POL storage facilities. It describes the types of attacks, summaries their effects, points out the importance of secondary damage due to POL fires, and raises questions about present-day vulnerabilities to conventional air attacks. The note is based mainly on the detailed reports of the United States Strategic Bombing Survey. (Author)

AD-A089 419/6 PC **A04**/MF **A01**
Army War Coll Carlisle Barracks PA
Never Send an Infantryman Where You Can Send an Artillery Shell.
Study project rept.,
Thomas R. Stone. Jun 80, 61p

General William H. Simpson commanded the American Ninth Army throughout its entire period of combat in the European Theater of Operations in the Second World War. This biographical paper deals with Simpson's leadership. It is set in the period during which Simpson was preparing his army for an assault crossing of the Rhine River. Simpson was under the operational command of the British Field Marshal Montgomery. Relations between Simpson and Montgomery are discussed and particular attention is paid to their disagreement concerning the role that Ninth Army should have in the Rhine crossing. Though these two commanders spoke the same language and were both dedicated to defeating a common enemy, they differed on tactical matters. Those interested in the problems of interoperability might well explore previous experiments such as the placement of this American Army under British command. (Author)

AD-A089 452/7 PC **A03**/MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
'In situ' Measurement of the Ratio of Aerosol Absorption to Extinction Coefficient.
Technical rept.,
Charles W. Bruce, Young Paul Yee, and S. G. Jennings. Aug 80, 32p Rept no. ERADCOM/ASL-TR-0064

A knowledge of the proportion of absorbed to scattered radiation for countermeasure smokes is necessary for modeling battlefield effects. Measurement of the total scattered component, however, is difficult. This report presents results obtained by using a new and simpler approach focussing on the extinction and the absorption coefficients (the total scattering coefficient is the difference quantity). Measurements of the absorption and extinction coefficients due to smoke produced by the combustion of 'red phosphorous' are simultaneously obtained in a small test chamber. The same CO2 laser beam at lambda = 9.55 micron is used to produce both results. A form of aerosol spectrophone cell was used to measure the absorption coefficient while functioning as a transmission cell from which the extinction coefficient was calculated. The ratio of the absorption to extinction coefficients was then compared with estimates of the same quantities based on calculated particle sizes, the particle size estimates being obtained from characteristics of the settling process. The ratio agreed with that predicted within the experimental error. (Author)

AD-A089 532/6 PC **A07**/MF **A01**
Army Command and General Staff Coll Fort Leavenworth KS
A Survey of Soviet Airborne History and Missions.
Master's thesis,
Frederick E. Van Horn. May 74, 137p AD-E750 003

The purpose of this paper is to survey available information on Soviet airborne forces and present a description of Soviet airborne history and missions. The survey was conducted by means of library research. The survey indicates that the Soviets intend to use their airborne forces for offensive operations in the tactical, operational, and strategic rear of their enemy during nuclear and conventional wars. They will use these forces to add depth to the battle, to exploit nuclear attacks and to accomplish a variety of strategic, operational, and tactical missions. (Author)

AD-A089 533/4 MF **A01**
Army Command and General Staff Coll Fort Leavenworth KS
Fashoda: Turning Point in Anglo-French Relations: a Study in Military-Political Affairs.
Master's thesis,
Paul W. Grenier. 1976, 85p AD-E750 004
Availability: Microfiche copies only.

This thesis deals with the military confrontation between French and Anglo-Egyptian forces at Fashoda, in the Nilotic Sudan, during the period 19 September to 11 December, 1898. It examines the confrontation, on both the French and the British sides, as to origin, preparation, conduct, and resolution. It concludes that the peaceful resolution of the Fashoda Crisis was a major contributing factor in the Entente between France and Great Britain in 1904, and that an analysis of the political-military relationships used by France in her military failure at Fashoda, and by Great Britain in her success, shows that military activity is and must be politically defined, that conflict of interest is detrimental to military efficiency, and that victory is ultimately a political concept. (Author)

AD-A089 567/2 PC **A02**/MF **A01**
MARK Resources Inc Marina Del Rey CA
Timing for Extended Target Simulation.
Technical note,
R. L. Mitchell. 4 Jan 78, 3p Rept nos. MRI-149-6, MRI-TN-105-033
Contract DAAK40-78-C-0031

Several timing runs were conducted on the CDC Cyber 73 system for the baseline extended target simulation program. The timing is dominated by the Doppler update in ETGDM, the subroutine that should also be called more frequently than ETGEO. If both subroutines are implemented on the Datacraft/6, one can anticipate about a factor of 3 slower performance. Thus about 4 scatterers can be accommodated. The glint and Doppler modulation (ETGDM) is best done on the AP120B. Assuming a conservative factor of 20 faster performance for this processor.

AD-A089 579/7 PC **A02**/MF **A01**
MARK Resources Inc Marina Del Rey CA
Extended Target Simulation Program. Revision II.
Technical note,
R. L. Mitchell. 20 Jun 78, 23p Rept nos. MRI-149-24-REV-2, MRI-TN-105-046-REV-2
Contract DAAK40-78-C-0031

Two revisions have been made to the extended target simulation program: (1) The target aspect angle is measured from the roll axis, not in the wing plane. This change was implemented in ETGEO by redefining a new angle (ANGL), and in the argument list in SCTAMP. (2) In order to introduce some 'randomness' from run to run, a bias angle (ST) is added to the target aspect angle in SCTAMP. It was suggested that this angle be a random variable, uniform over + or - 2 deg, that is chosen at the beginning of each run. The changes made since 5 May 78 (the version described in MRI Report 149-21) are indicated by a double $$ beginnig in column 73. Only MAIN, ETGEO, and SCTAMP are affected. (Author)

16. MISSILE TECHNOLOGY

16A. Missile Launching and Ground Support

AD-A089 186/1 PC **A07**/MF **A01**
Effects Technology Inc Santa Barbara CA
Missile Site Rock Characterization and Penetration Test Results.
Final rept. 9 Jan-1 Nov 79,
John D. Carlyle. 14 Dec 79, 130p DNA-5144F, AD-E300 905
Contract DNA001-79-C-0115

The in-situ particulates from representative candidate missile deployment parcels have been characterized as part of the effort described in this report. An assessment of the ballistic penetration for the range of rock types found at proposed basing sites has been made for a Ti(6Al 4V) target material in order to evaluate the variation in the extent of damage to a missile shroud during ascent. The penetrability of the baseline tonalite granite was found to be comparable to several of the in-situ rock types for high impact velocities. Volcanic tuff and scoria which represent rock units that constitute 40 to 90% of the geology in any one candidate deployment sites surveyed were found to be two to three times less penetrating than the tonalite granite representative projectile types. A correlation of data bases for various projectiles was obtained from the current test results and the literature. From this correlation and the approach used for this effort, a test methodology for the characterization of shroud materials/concepts and motor-case protection materials is recommended. (Author)

16C. Missile Warheads and Fuses

AD-A089 185/3 PC **A03**/MF **A01**
Aerospace Corp El Segundo CA Vehicle Engineering Div
Nose Tip Shape Optimization for Minimum Transpiration Coolant Requirements.
Final rept. 1 Aug 76-30 Jun 78,
R. L. Baker, and R. F. Kramer. 15 Sep 80, 44p TR-0080(5550-01)-3, SD-TR-80-64
Contract F04701-79-C-0080

Expressions for the total heat transfer to a nose tip for a realistic reentry trajectory have been obtained by using local laminar and turbulent convective heat transfer relationships and extending the trajectory integration procedures of earlier investigators. Then, employing approximate relationships for the boundary layer edge properties along the nose tip surface, a variational calculus approach to determine nose tip shapes which minimize the total trajectory heat transfer (coolant requirements) for fixed fineness ratio and reentry parameters is utilized. The calculated minimum heat transfer shapes found have a flat nose with an expansion corner followed by an afterbody with monotonically decreasing slope. The height of the flat nose relative to the base radius decreases as the fineness ratio decreases. However, for fineness ratios greater than 0.2, the laminar and turbulent solution shapes were found to be very similar to one another. For fineness ratios approaching zero (i.e., slender bodies), the laminar and turbulent minimum heat transfer shapes are 1/2 and 8/13 power law bodies, respectively. The relative heat transfer rate to a particular one of the minimum heat transfer shapes was found to be a factor of up to three times lower than that for other body shapes having the same fineness ratio.

16D. Missiles

AD-A089 169/7 PC **A07**/MF **A01**
Houston Univ TX Dept of Electrical Engineering
Analytical Design of Terminally Guided Missiles.
Final rept. 1 Feb-31 Dec 79,
Leang-San Shieh. 2 Jan 80, 139p
Contract DAAK40-79-C-0061

The newly developed dominant-data matching method has been successfully extended to design a digital pitch control system of a semiactive terminal homing missile system. As a result, the designed digital controller can be implemented on a microprocessor. Also, a direct-decoupling method for mulitvariable control system designs has been developed and modified. This newly developed simple and practical method can be readily applied by a practicing control engineer for coupled high-order multivariable control system designs. The feasibility of synthesizing a multi-port controller without using integrators has been studied. As a result, a new matrix Sturm series and block canonical form of a matrix transfer function has been developed. The practical applications of the newly developed results on multi-port network synthesis are further investigated. Other new findings of this research are reported in the appendix. (Author)

AD-A089 171/3 PC **A07**/MF **A01**
Houston Univ TX Dept of Electrical Engineering
Redesign of the Stabilized Pitch Control System of a Semi-Active Terminal Homing Missile System.
Final rept. 8 Dec 77-31 Jan 79,
Leang-San Shieh. 20 Apr 79, 140p
Contract DAAK40-78-C-0017

A high-order stabilization filter was formerly designed to stabilize an unstable pitch control system of a terminal homing missile system. In this report, a new dominant-data matching method is presented to redesign the high order stabilization filter. Using this new method several reduced order filters are obtained. As a result, the cost of implementation is reduced and the reliability is increased. An algebraic method is also applied to redesign the stabilization filter so that the performance of the redesigned pitch control system is improved. In addition, the proposed dominant-data matching method can be applied to determine a reduced order model of a high order system. Unlike the reduced order models obtained by most existing model reduction methods, the reduced order model mentioned above has the exact assigned frequency-domain specifications of the original system. The dominant-data matching method can also be applied to identify any practical system. (Author)

17.

NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

17A. Acoustic Detection

AD-A089 651/4 PC **A06**/MF **A01**
Sperry Research Center Sudbury MA
Time-Domain Sonar Target Response Modeling.
Final rept.,
H. Mieras, and C. L. Bennett. Oct 79, 108p Rept no. SRC-CR-79-74
Contract N61331-78-C-0049

The acoustic response of simple metallic targets submerged in water is studied under this contract. The aim is to develop an interpretation of the process which would permit its characterization by a simple model. This work is a continuation of a previous contract, which should be referred to for the general background of this problem and for greater detail of the space-time integral equation approach. The classical solution for acoustic scattering from a penetrable homogeneous sphere is studied first in Section 2. It is seen that hard or soft target approximations are not valid for metallic targets (except at very low frequencies), but the resonances are present which are characteristic of the interior composition. Viewed in the time domain, the impulse response of a target consists of a sequence of pulses following the specular impulse. The arrival times of these pulses can be related directly to the elastic constants of the target and medium. In Section 4, the space-time integral equation approach is described. In Section 5, the results of previous sections are extended to the hulled target.

AD-A089 679/5 PC **A02**/MF **A01**
Naval Underwater Systems Center Newport RI
Performance Degradation in a Quadrature Receiver for CW Signals Corrupted by Multipath.
Technical rept.,
R. C. Higgins. 2 Sep 80, 24p Rept no. NUSC/TR-5908

In active sonar applications, a quadrature receiver can be employed to detect the presence of an underwater reflector. This well-known receiver performs optimally when the input waveform is a coherent signal (i.e., constant but unknown amplitude and phase) embedded in white, zero-mean noise. Unfortunately, when an attempt is made to detect a distributed highlight reflector in a multipath environment by using a narrowband transmit signal, the various multipath returns may overlap, producing a non-resolvable multipath situation and causing the amplitude and phase of the signal to become random functions of time. Under these circumstances, the detection performance of the quadrature receiver is degraded compared to its performance with a coherent signal. This study theoretically measures the degradation in the receiver's output signal-to-noise ratio (SNR) when the input waveform consists of a narrowband Gaussian signal embedded in white noise. The output SNR's dependence on the correlation characteristics of the input signal is clearly shown. (Author)

PAT-APPL-6-142 322 PC **A02**/MF **A01**
Department of the Navy Washington DC
Towed Deployment Acoustic Arrays.
Patent Application,
Paul Warnshuis, Jr., and Peter Serrell. Filed 21 Apr 80, 22p AD-D007 457/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A compact, unitary sensor array support structure for use in a water medium comprises a plurality of scissor arms mounted on a support. The scissor arms are extended from the support to expand the sensor array, and are retracted to the support when the array is to be recovered. The support with the scissor arms retracted thereto is slidably housed within a container. Together, the support and the container form a hydrodynamic body which can be transported by towing in the water or removed from the water for transport or storage. (Author)

PB81-102287 PC **A02**
Wisconsin Univ.-Madison. Geophysical and Polar Research Center.
Backscattering Cross Sections of Live Fish: PDF (Probability Density Function) and Aspect,
Kung Huang, and Clarence S. Clay. c1980, 11p WIS-SG-80-712, CONTRIB-377, NOAA-80081305
Pub. in Jnl. of the Acoustical Society of America, v67 n3 p795-802 Mar 80.

The probability density function (PDF) of the peaks of the envelopes of sonar echo from live fish were measured at beam aspect. The measurements were made at 220 kHz and in a waveguide. The fish was the common shiner (Notropis cornutus) and was about 120 mm (about 18 acoustic wavelengths) long. The PDF of the echoes was approximately Rayleigh when the fish was moving gently. The target strengths of the common shiner (120 mm) and the mummechog (Fundulus heteroclitus, 100 mm) were measured as a function of aspect angle. Comparison of the experimental measurements and Love's empirical target strength for any aspect showed that the measured target strengths at broadside aspect were about the same and the target strengths at other aspect angles were several decibels less than Love's values. Linear arrays of point scatters were chosen to match the gross aspect dependence of the targert strengths of the fish. The lengths of the arrays were 6.5 mm for the common shiner and 16.5 mm for the mummechog. These lengths were less than the lengths of the corresponding fish's swim bladders.

17B. Communication

AD-A089 198/6 PC **A03**/MF **A01**
Threshold Technology Inc Delran NJ
DLMS Voice Data Entry.
Final technical rept. 28 Sep 78-16 Nov 79,
Phillips B. Scott. Jun 80, 49p RADC-TR-80-220
Contract F30602-78-C-0327

This report describes the design, principles of operation, and performance characteristics of an Advanced Development Model of a voice recognition system (VRS) which can serve to input cartographic data to a computer. The completed system has been installed at the Defense Mapping Agency Aerospace Center (DMAAC) at St. Louis, MO, for evaluation and testing. The VRS is intended for use in entering by voice cartographic data to the Digital Landmass System (DLMS) Data Base. It was designed to satisfy the DMAAC product specifications. The software developed for the VRS includes two complete stand-alone programs. Performance tests conducted at TTI disclosed an average system word recognition accuracy of just under 99 percent for five talkers. The recognition tests were conducted by the use of tape recordings. These tape recordings were made during a previous contract involving cartographic data entry. Each person spoke approximately 536 words after uttering five training repetitions. The test results were virtually identical to those obtained during the previous contract.

AD-A089 210/9 PC **A10**/MF **A01**
Georgia Inst of Tech Atlanta School of Electrical Engineering
An Analysis of Objective Measures for User Acceptance of Voice Communications Systems.
Final rept.,
Thomas P. Barnwell, III, and William D. Voiers. Sep 79, 222p Rept no. E21-659-78-TB-1
Contract DCA100-78-C-0003
Prepared in cooperation with Dynastat, Inc., Austin, TX.

The report presents the results of a large study of the statistical correlation between a data base of subjective speech quality measures and a data base of objective speech quality measures. Both data bases were derived from approximately eighteen hours of coded and distorted speech. The subjective test used was the Diagnostic Acceptability Measure (DAM) test. The objective measures included spectral distance measures, frequency variant spectral distance measures, a signal-to-noise measurements, area ratio distance measures, log area ratio distance measures, PARCOR distance measures, log PARCOR distance measures, feedback coefficient distance measures, log feedback coefficient distance measures, residual energy ratio distance measures, and composite measures. The analysis procedures included linear regression analysis, multiple linear regression analysis, and nonlinear regression analysis. In all, approximately 1,500 variations of these objective measures were studied. The figure-of-merit used for measuring the performance of an objective measure was the estimated correlation coefficient between the objec-

tive measure and the subjective data base. Parametrically different distance measures were compared using nonparametric pairwise rank statistics. The results of this study give quantitative predictions of the performance of many objective speech quality measures for predicting subjective user acceptance.

AD-A089 224/0 PC **A13**/MF **A01**
Comsat Labs Clarksburg MD
COMSAT Participation in ARPA Packet Satellite Program (PSP).
Final rept. 1 Jun 78-1 Sep 79,
L. C. Palmer, D. Mills, and S. Rothschild. Oct 79, 287p CL-TSLAP-79-2, SD-TR-80-32
Contract F04701-76-C-0240, ARPA Order-3287

This final report summarizes the last year of the Communication Satellite Corporation's (COMSAT's) participation in the Atlantic Packet Satellite Program (SATNET), an experimental program involving packet data transmission via a single 64 Kb/s SCPC channel in the SPADE Transponder of INTELSAT IVA (Atlantic Primary) between standard A earth stations at Etam, W.Va., Goonhilly U.K., and Tanum Sweden. A fourth, smaller (G/T = 28.5 dB/K) earth station at COMSAT Laboratories, Clarksburg, Md. also participated in the experimental network. The report describes new packet satellite program (PSP) terminals which were fabricated at COMSAT Laboratories for installation at the large INTELSAT earth stations. These terminals contain the necessary interfaces and modems to interconnect the SIMP (Satellite Interface Message Processor) and the earth station intermediate frequency (i.f.) equipment. Also described is the command and monitoring (C&M) module which is a part of the PSP terminal. Channel monitoring data collected during 1979 are summarized. Preliminary tradeoff result comparing packet satellite transmission to other alternatives are also included in the report. (Author)

AD-A089 245/5 MF **A01**
Naval Postgraduate School Monterey CA
A Feasibility Study of Incorporating ARPANET Type Technology at United States Naval Installations.
Master's thesis,
Michael Gilbert Shaw. Mar 80, 120p
Availability: Microfiche copies only.

This thesis investigates the feasibility of using ARPANET type technology at Naval Air Station, Lemoore, California. Aspects of functions on the ARPANET, their applications to needs in the United States Navy in general and more specifically their application at Naval Air Station Lemoore were investigated. Emphasis was placed on improvements in readiness, expediency, and efficiency, with discussion of monetary and man-hour savings where applicable. This is a baseline study for potential users to illustrate what can be done in an operational setting. The study concludes that ARPANET installation is technologically feasible, appears to be relatively inexpensive compared to multiple individual minicomputer installations, and has the added importance of being a significant management tool. Before implementing these ideas, further detailed analysis would be required comparing operating, maintenance and training costs. (Author)

AD-A089 293/5 PC **A03**/MF **A01**
Naval Postgraduate School Monterey CA
Desirable Properties of a Network Taxonomy.
Technical rept.,
Earl E. McCoy, and Bernard J. Carey. May 80, 45p Rept no. NPS52-80-007

This paper reviews and analyzes the desirable properties of a computer network taxonomy from the point of view of its usefulness in a design procedure. A key factor that must be considered is that the design environment currently evolving uses functionally high level VLSI-based building blocks to construct various network architectures. This paper begins by reviewing the uses of a taxonomy in a network context, and continues with a review of specifications for network requirements. A set of hardware interconnection primitives is defined next. A review of the Anderson and Jensen taxonomy (Ander75) is then presented, with a discussion of its completeness. The main thrust of this article is given in a section of attributes of a design oriented taxonomy. Finally, extensions are proposed for fault tolerant considerations and protocols. A computer network is defined to be a hetrogeneous collection of computers and the telecommunications subsystem linking them together. Here the properties of the various network architectures are of particular interest; the 'user' computers (or processors) are considered as sources and sinks of messages being transmitted over the network. No distinction as to the geographical scope of the network is made because it does not impact the taxonomy considerations addressed here. (Author)

AD-A089 392/5 PC **A02**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Voice-Controlled Transceiver for Free-Fall Parachutists,
William M. Rice. Aug 79, 17p Rept no. ARL/MECH ENG NOTE-376

A requirement exists for speech communication by radio between parachutists, e.g. student and instructor, during free-fall training. Such equipment must be very compact, and provide fully 'hands-off' operation, using voice-controlled changeover from receive to transmit. Prototype transceivers have been developed using sub-assemblies from AN/PRC-90 equipment with an added voice-control module. The equipment and its trial results are described and considerations relating to possible production are discussed. (Author)

AD-A089 420/4 PC **A04**/MF **A01**
Army War Coll Carlisle Barracks PA
NATO Ground Forces Communications Interoperability from the American Perspective.
Study project rept.,
Edward R. Baldwin, Jr. 26 May 80, 54p

The 'layer cake' assemblage of ground forces from several NATO nations in the Central Region has resulted in unique communications interoperability requirements. Multiple political, economic, and military considerations make the early achievement of substantive standardization of communication equipment extremely doubtful, therefore emphasis logically must now be placed on the interoperability of current and projected near-range national equipment. Current experiences in Europe, both within the international structure and the US elements, demonstrate that the American Army must: (1) prepare to fight a coalition war in Europe; (2) exercise centralized communication planning and management at Department of the Army level; (3) field only those items of tactical communication equipment which are proven by operational testing to be reasonably survivable and maintainable under wartime conditions; (4) plan for and provide augmentation communications assets to US ground forces committed to combined operations with elements of other nations; and (5) prepare combat units to fight effectively with less communications support. (Author)

AD-A089 493/1 MF **A01**
Naval Postgraduate School Monterey Ca
Petri-Net Simulations of Communications Networks.
Master's thesis,
Stephen Craig Jennings, and Robert John Hartel. Mar 80, 181p Rept no. NPS52-80-003
Availability: Microfiche copies only.

Current technologies in the fields of telecommunications and computer processing are becoming increasingly integrated to the extent that 'distributed' computer networks are assuming key roles in communications. The complex computerized systems necessary to support modern military command and control requirements are expensive. Designing such systems by trial and error is not feasible, yet no other viable alternatives exist. This thesis offers an original methodology for evaluating the predicted performance of military automated systems. Using Petri-Nets as a modeling tool, computer simulations with color graphics output are performed to demonstrate the feasibility of this approach as a systems design tool. (Author)

AD-A089 531/8 MF **A01**
Army Command and General Staff Coll Fort Leavenworth KS
Digital Voice - a Key to Tactical Communications in the 1980's.
Master's thesis,
Jack C. Hammett, Jr. 1976, 165p AD-E750 005
Availability: Microfiche copies only.

This research is a study of the performance of U.S. Army voice circuits in the transitional DoD telecommunications system of the 1980's. Transmission, switching, and user terminal facilities will be converted from analog to digital operation during the next two decades. Voice circuits during the transition will be composed of various tandem (series) connections of pulse code modulation (PCM), continuously variable slope delta (CVSD) and vocoder links. The purpose of the research is to determine if the system design for the 1980's results in isolated pairs of users. The approach is to examine the technical characteristics of digital voice links, to consider the system plans of the Services and DoD Agencies, to evaluate the mode of interoperability at the boundaries which join the several regions of the overall DoD system, and to analyze the signal-to-noise ratio (SNR) performance of tandem-link circuits within the U.S. Army system. The study concludes that some isolated pairs of users will exist in the transitional system, but the occurrence of isolated pairs of users may be minimized by providing digital transmission paths to directly interconnect communities of 16 kB/s subscribers. The system designs for the U.S. Army System and the overall DoD System include workable interoperability solutions. By managing the transition in an enlightened manner, the reliability of secure voice communications may be enhanced and the operational capability to satisfy new data communications needlines may be increased. The principal recommendation of the study is that the occurrence of tandeming of voice links should be minimized. (author)

AD-A089 534/2 PC **A10**/MF **A01**
Army Command and General Staff Coll Fort Leavenworth KS
Conversion of the Defense Communications System from Analog to Digital Form.
Master's thesis,
Richard A. Stanley. Jun 74, 201p AD-E750 001

Given that the Defense Communications System (DCS) plans to convert from analog to digital transmission, the paper examines that decision in an attempt to determine major problem areas and topics worthy of further study. The DCS history, organization, and structure are examined, and modulation theory and techniques are reviewed. Current development in advanced communications technology is examined, and the implications of these developments on the DCS conversion are examined and evaluated. Anticipated major problem areas are deduced, and areas that require further investigation are enumerated. (author)

AD-A089 596/1 PC **A03**/MF **A01**
University of Southern California Marina Del Rey Information Sciences Inst
A Distributable, Display-Device-Independent Vector Graphics System for Command and Control.
Research rept.,
Richard Bisbey, II, and Dennis Hollingworth. Jul 80, 42p Rept no. ISI/RR-80-87
Contract DAHC15-72-C-0308, ARPA Order-2223

This report documents a distributable, device-independent vector graphics system developed by ISI for the Defense Advanced Research Projects Agency. It describes the system architecture, communications elements, and a phased implementation strategy. The system supports graphics-based command and control applications in distributed computational environments such as the ARPANET. The system has been in use at ISI and at the Naval Ocean Systems Center (NOSC) in the Advanced Command and Control Architectural Testbed (ACCAT) since January 1977. The principal aim of the development effort is the device-independence of the vector graphics. 'Device-independence' means that graphic application programs can be written without regard to the particular display-device on which the output will ultimately be displayed. This system achieves display-device independence by providing the application program with a set of generic, two-dimensional vector graphic primitives by which pictures can be

described and interacted with at the application-level. The particular graphics model used structures pictures as sets of subpictures that are absolute-transformed-segments, as defined by Newman and Sproull. (Author)

AD-A089 617/5 PC **A10**/MF **A01**
Perceptronics Inc Woodland Hills CA
Information Collection and Correlation Decision Support System for the Marine Corps TCO Environment.
Final technical rept. 1 Jul 79-30 Jun 80,
Alain Crolotte, and Joseph Saleh. 15 Aug 80,
209p Rept no. PATR-1069-80-8
Contract N00014-78-C-0495

This report describes an information collection and correlation (ICC) decision support system designed to aid the process of combat information production in Marine amphibious operations. Three operators perform information correlation: one at the reconnaissance and surveillance (R&S) station of the division Intelligence Center, another at wing level and a third one at the Marine Amphibious Force (MAF) level. They correlate new information with existing information in order to maintain a file which contains the most current picture of the enemy situation in the form of ground tracks. In addition, the MAF operator performs combat information coordination. The present unaided information correlation system is likely to create information overload resulting in processing delays and failure to make combat information available in a timely manner. The ICC support system was designed to reduce this overload by automating or aiding of some of the functions involved in combat information production. The system covers the following processes: (1) reliability assessment, (2) identity identification, (3) conflict identification, (4) conflict resolution, and (5) information selection. The support system has been designed for implementation in the Marine Tactical Combat Operations (TCO) System.

AD-A089 628/2 PC **A05**/MF **A01**
Delta Information Systems Inc Jenkintown PA
Use of a Microprocessor to Implement an ADCCP Protocol (Federal Std-1003) Operating in the Unbalanced Normal Mode.
Final rept.,
Stephen J. Urban, and Richard A. Schaphorst.
May 80, 90p NCS-TIB-80-2, AD-E100 394
Contract DCA100-79-M-0190

The objective of this program is to develop block diagrams, flow charts, and computer programming for the unbalanced normal class of procedures in accordance with Federal Standard 1003 'Telecommunications: Synchronous Bit Oriented Data Link Control Procedures (Advanced Data Communication Control Procedures)'. The purpose of this effort is to determine the feasibility of using the M6800 or similar microprocessor, to implement this type of protocol, and to obtain an estimate of memory and processor resources that would be required. (Author)

ED-179 231 Not available NTIS
Nielson (A.C.) Co., Chicago, IL.
1979 Nielsen Report on Television.
1979, 40p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from A. C. Nielsen Co. Nielsen Plaza, Northbrook, IL 60062 (Free).

The Nielson data on commercial television viewing and programming contained in this report are estimates of the audiences and other characteristics of television usage as derived from Nielson Television Index and Nielsen Station Index measurements. Data and brief discussions are provided on the number of commercial and public stations; number of households owning television sets; television audience characteristics; percent of households using television; average hours of household TV usage per day; hours of TV usage per week by household characteristics; weekly viewing activity for women, men, and children of various age groups; prime time viewing; audience composition of selected prime time program types; TV specials by program type; most popular programs; cable telvision; and Nielsen television services.

N80-31685/4 PC **A10**/MF **A01**
ARINC Research Corp., Annapolis, MD.
Video Distribution System Cost Model.
Final Report.
I. Gershkoff, J. K. Haspert, and B. Morgenstern.
Jul 80, 225p NASA-CR-160020, PUBL-1358-01-3-2238
Contract NAS5-25401

A cost model that can be used to systematically identify the costs of procuring and operating satellite linked communications systems is described. The user defines a network configuration by specifying the location of each participating site, the interconnection requirements, and the transmission paths available for the uplink (studio to satellite), downlink (satellite to audience), and voice talkback (between audience and studio) segments of the network. The model uses this information to calculate the least expensive signal distribution path for each participating site. Cost estimates are broken downy by capital, installation, lease, operations and maintenance. The design of the model permits flexibility in specifying network and cost structure.

N80-31711/8 PC **A03**/MF**A01**E
Fondazione Ugo Bordoni, Rome (Italy).
Activities in the Field of Communications in Italy, 1978 Relazione Sull'Attivita di Collaborazione Con l'Istituto Superiore Poste E Telecomuncazione Svolta Dalla Fondazione Ugo Bordoni Nel 1978.
Annual Report.
R. Koch. Feb 79, 50p
Text in Italian.

The 1978 research activities are summarized covering radio communication systems, cable communication systems and digital sytems, automatic systems in communications, management and control, and laser systems and optoelectronics.

N80-31712/6 PC **A02**/MF**A01**E
Fondazione Ugo Bordoni, Rome (Italy).
The Possibility of Utilizing Coding Techniques to Improve the Availability of Digital Radio Link Networks at Frequencies over 10 Ghz Possibilita' di Impiego di Techniche di Codifica Per Migliorare la Disponibilita' di Rete in Ponti Radio Numerici a Frequenze Superiori a 10 Ghz.
A. Bernardini, P. Mandarini, and G. Meucci. Dec 78, 20p FUB-54-1978
Text in Italian.

An optimal solution of the number of available circuits as a function of the out-of-service probability by using couples of channel co-decoders at the extremities of the radio link is developed. The conclusions are extended to suboptimal solutions with different degrees of redundancy. The evaluation of hop length in the absence of the co-decoding method is presented.

N80-31716/7 PC **A02**/MF**A01**E
Fondazione Ugo Bordoni, Rome (Italy).
Customer Access Protocols to Integrated Services Digital Networks.
N. Accarino, M. Decina, C. Rossi, and A. Roveri.
Jun 79, 11p FUB-7-1979
Presented at 27TH Intern. Conv. On Commun., Genoa, Oct. 1979.

Trends in the conception of local digital networks offering a variety of services including data and telephony are presented, and the interaction between customer access protocols and network architectures discussed. The basic features of a customer-to-network signalling scheme are presented which allow the full treatment of circuit-switched data calls at 64 kbit/s by the Pulse Code Modulation (PCM) local and trunk exchanges and the processing of packet switched data calls by specialized network nodes accessed on demand via the PCM facilities.

N80-31718/3 PC **A05**/MF**A01**E
Fondazione Ugo Bordoni, Rome (Italy).
Procedures for out-of-Service Verification and Hop Length Dimensioning in Numerical Radio Links Procedimenti di Verifica di Fuori Servizio E di Dimensionamento di Trattra in Ponti Radio Numerici.
A. Bernardini, P. Mandarini, and G. Meucci. Jun 79, 77p FUB-10-1979
Text in Italian.

General procedures for out of service verification in a 2500 km radio link in the presence of propagation anomalies due to rain of multipath are studied. It is shown that the out of service situation may be verified if the out of service probability function is known, and this function is examined for the cases of cross polarization attenuation and of uniform attenuation and depolarization. A FORTRAN program was written to perform the estimation. The out of service verification in the presence of selective attenuation due to multiple path and depolarization is discussed, including the evaluation of the space diversity effects on the out of service probability.

N80-31719/1 PC **A02**/MF**A01**E
Fondazione Ugo Bordoni, Rome (Italy).
Development of Cost 202 Project: Numerical Local Networks for Telecommunications Stato di Sviluppo Del Progetto Cost 202: Reti Locali Numeriche Per Telecomunicazioni.
N. Accarino, M. Decina, R. Montemuro, C. Rossi, and F. Villani. Jun 79, 9p FUB-14-1979
Text in Italian.

The COST 202 project is defined as a three-year research project studying digital techniques employable within the next 30 years in local networks. The participation of several European nations is mentioned. The main areas of the project which were agreed upon, are the evolution of local networks, signalization in local networks, and transmission on existing lines. The preliminary research activities undertaken by the Italian group are detailed, including 64 kbits numerical telephony, new services in circuit or packet switching up to 64 kbit/s telemetry, access to local networks, transmission interfaces, and terminal architecture.

N80-31720/9 PC **A02**/MF**A01**E
Fondazione Ugo Bordoni, Rome (Italy).
Capacity Optimization of a Reserve Network Used for Rerouting Damaged Service Blocks Ottimizzazione Delle Capacita' di Una Rete di Riserva Impiegata Per Il Reistradamento Dei Blocchi di Esercizio in Avaria.
G. Bonaventura, U. Mocci, and G. Ravaioli. May 79, 10p FUB-18-1979
Text in Italian. Presented at 27TH Intern. Conv. On Commun., Genoa, 9-12 Oct. 1979.

The use of a standby network is an effective method for the rerouting of groups of circuits when a fault occurs on a transmission medium in a long distance network. Two problems are considered: to find a minimum cost standby network able to reroute all the interrupted groups, at least when only one block at a time is defective; and to find the largest part of the in-service network that can still be protected meeting a prescribed bound on the cost of the standby network. The influences of different choices of rerouting criteria and of network structure are examined using a computer program.

N80-31721/7 PC **A02**/MF**A01**E
Fondazione Ugo Bordoni, Rome (Italy).
A Procedure for Satisfying in an Optimal Way Time Varying Circuit Requirements Una Procedura Per Il Soddisfacimento Ottimo di Richieste di Circuiti Variabili Nel Tempo.
F. Mazzarella, U. Mocci, G. Ravaioli, and S. Spedaletti. May 79, 9p FUB-19-1979
Text in Italian. Presented at 27TH Intern. Conv. On Commun., Genoa, 9-12 Oct. 1979.

The problem of satisfying at minimum cost, time-varying circuit requirements between centers of a telecommunication network is considered. The overall procedure works in two phases. In the first, one of the requirements are routed through the network, and the circuit number of each link is computed. In the second phase, an optimal plan of installation is determined. The procedure was implemented with a computer program.

N80-31723/3 PC **A03**/MF**A01**E
Fondazione Ugo Bordoni, Rome (Italy).
Influence of Propagation Characteristics and Repeaters on the Performance of a Multiple Link Teletext System Influenza Delle Caratteristiche di Propagazione E Dei Ripetitori Sulle Prestazioni di UN Sistema Teletext a Piu' Rimbalzi.
P. Mandarini. Dec 79, 37p FUB-24-1979

Text in Italian.

A general method of system analysis is presented, and used for the determination of the error probability function for any given situation, including propagation or equipment anomalies. The method is also employed to determine the relationship between the mentioned anomalies and the variations in the signal to noise ratios. Two examples of teletext transmission simulation are given, one assuming ideal propagation conditions and the other assuming a 250 KHz detuning, in both from 14 dB down to an error probability of 10 to the minus 8th power.

N80-31724/1 PC **A03**/MF**A01**E
Fondazione Ugo Bordoni, Rome (Italy).
Evaluation of Service Availability in a Packet Switching Network Sulla Valutazione Del Grado di Servizio di Una Rete a Commutazione di Pacchetto.
N. Accarino, G. Barbanera, and C. Rossi. Sep 79, 47p FUB-26-1979
Text in Italian.

After reviewing the problem parameters and defining the service availability as a function of the average delay time, the flow deviation method is used for optimizing the routing strategy of the network. The routing is of a proportional type based upon minimizing the average delay time. A computer program is presented and its applications are discussed.

N80-31726/6 PC **A04**/MF**A01**E
Thomson-CSF, Meudon-la-Foret (France). Dept. Espace-Satellites.
A Feasibility Study of a Satellite Frequency Modulation Broadcasting System. Volume 3: Complementary Study on the Attenuation in the Shadow Zones, Multiple Paths, and Circular Polarization Reception Antennas Etude de Faisabilite d'UN Systeme de Radiodiffusion Sonore a Modulation de Frequence Par Satellite. Volume 3: Complement d' Etude sur Attenuation dans les Zones d'Ombre-Trajets Multiples-Antenne de Reception en Polarisation Circulaire.
Final Report.
V. Biggi, and F. Horgan. Dec 79, 60p ESA-CR(P)-1313-V-3
Contract ESA-3208/77-F-HGE(SC)
Partly in English and French.

The attenuation in shadow zones caused by several obstacles was measured. The statistical reception improvement obtained using space diversity by means of two antennas and two receptors on the same automobile was evaluated. It was found that in all cases a distinct improvement may be expected from a system of diversity reception. Measurements were made using a circularly polarized receiving antenna, resulting in a 3 dB improvement for the received signal.

PAT-APPL-6-126 588 PC **A03**/MF **A01**
Department of the Navy Washington DC
Apparatus and Method for Multiplexing Digital Signals.
Patent Application,
John T. Redfern, and Gary A. Dressel. Filed 3 Mar 80, 39p AD-D007 458/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention is an apparatus and method for multiplexing digital information acquired from a multiplicity of data terminals distributed along a conductor of given length. A cyclic synchronization signal consisting of a stream of coding periods is transmitted upon the conductor. The duration of each coding period exceeds the two way travel time through the conductor. The leading edge of a coding period stimulates the transmission of one bit of a digital word stored in each terminal. The bits from the terminals arrive at a system receiver in a time sequence corresponding to the spatial distribution of the terminals. Bits are collected in storage registers according to their significance which is determined by the respective coding period during which they are received. A word from a particular terminal is derived by strobing the output of the storage registers at the time corresponding to the psition of the terminal. (Author)

PB81-104705 CP **T04**
Federal Communications Commission, Washington, DC. Data Automation Div.
Broadcast TV Data Base.
Data file,
Charles Johnson. 14 Oct 80, mag tape FCC/DF-80/023
Supersedes Rept. no. FCC/DF-78/014, PB-287 267.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

The Broadcast TV Data Base contains records for existing and proposed stations, allocations, and rulemaking petitions/proposals. The data base is converted from Honeywell system standard format BCD, to EBCDIC, 1600 BPI, 9 track, odd parity tape, on the Honeywell H-6023. The data base contains approximately 9175 records of 360 characters, 1 record per block.

PB81-108128 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Marine Industry Advisory Services.
A New Underwater Communication System,
Norman Doelling. 7 Jul 80, 23p MITSG-80-6, OPPORTUNITY BRIEF-19, NOAA-80091502
Index No. 80-606-Eso. Report on MIT/Marine Industry Collegium Program.

A functional prototype of a new sonar modem is undergoing preliminary testing. The leading edge technologies being used to implement the system allow programmable modifications of the system to suit a range of data communication needs. The studies reported are concerned with near vertical, short-range transmissions. The system considers the data source to be an instrument of some sort - compass for example. The data source, the encoding and the modulation hardware, and the transmitting hardware would be located in a remote untethered vehicle or in a self-contained, self-powered instrument package. The communication channel, in this case, is the ocean. The receiver and demodulating and decoding hardware are assumed to be on the surface. To minimize energy storage requirements on the remote self-powered systems, the general design philosophy has been to use encoding and transmitting systems that minimize the use of electric power and, thus, computational complexity. Receivers or demodulators are assumed to be located at the surface where power and space requirements are less restrictive and need not limit computational sophistication.

PB81-108433 PC **A09**/MF **A01**
National Telecommunications and Information Administration, Boulder, CO. Inst. for Telecommunication Sciences.
Proposed Techniques for Adding FM Broadcast Stations in a Major Market.
Technical rept.,
E. J. Haakinson. Aug 80, 184p NTIA-REPORT-80-44

A study was conducted to investigate the technical capacity of the FM broadcast spectrum and to determine if the FM spectrum's utilization could be increased. More assignments are possible if some or all of the following recommendations are adopted: (1) protection to existing facilities rather than to maximum facilities is granted, (2) the effects of terrain on signal coverage and interference are considered, (3) directional antennas to control both coverage and interference are used, (4) reasonable changes to the signal-to-interference protection rations for co-channel and adjacent channel operation are adopted, and (5) co-siting of second- and third-adjacent channel transmitters with existing transmitters is permitted. To demonstrate the approach of adding new assignments to a saturated major market, the report shows how the number of FM broadcast stations in the Dallas-Ft. Worth region could be increased from the present 21 stations to 38 stations.

PB81-108722 PC **A05**/MF **A01**
Federal Communications Commission, Washington, DC. Office of Plans and Policy.
Television Programming for Children: A Report of the Children's Television Task Force. Volume 1: Overview,
Susan C. Greene, Brian F. Fontes, Lois E. Wright, and Florence Setzer. Oct 79, 100p
See also Volume 2, PB81-108730.
Also available in set of 5 reports PC E99, PB81-108771.

The FCC began its study of children's television programming in the early 1970's. In 1974, the Commission issued its Children's Television Report and Policy Statement. This report provided guidelines to be followed by commercial TV broadcasters in providing children's programming, and outlined policy changes and additions regarding television advertising aimed at children. In 1978, the Commission reactivated the Children's Television Task Force to review changes that developed since the 1974 Policy Statement. The Task Force found that the television industry has generally compiled with the advertising guidelines, but generally did not comply with the programming guidelines. The Task Force found: (1) Little progress has been made in providing more programming designed for the specific needs of children; (2) Network affiliates air the bulk of their children's programming on Saturdays, and (3) there has been no substantial increase in the amount of age specific and educational/informational programming.

PB81-108730 PC **A05**/MF **A01**
Federal Communications Commission, Washington, DC. Office of Plans and Policy.
Television Programming for Children: A Report of the Children's Television Task Force. Volume 2: Compliance with the 1974 FCC Policy Statement,
Susan C. Greene, Brian F. Fontes, Lois E. Wright, and Florence Setzer. Oct 79, 100p
See also Volume 1, PB81-108722 and Volume 3, PB81-108748.
Also available in set of 5 reports PC E99, PB81-108771.

Volume II of the Children's Television Task Force Report reports the findings of a series of studies analyzing industry compliance with the 1974 Policy Statement.

PB81-108748 PC **A08**/MF **A01**
Federal Communications Commission, Washington, DC. Office of Plans and Policy.
Television Programming for Children: A Report of the Children's Television Task Force. Volume 3: Staff Research Papers,
Susan C. Greene, Brian F. Fontes, Lois E. Wright, and Florence Setzer. Oct 79, 163p
See also Volume 2, PB81-108730 and Volume 4, PB81-108755.
Also available in set of 5 reports PC E99, PB81-108771.

The Authors have undertaken comprehensive reviews of social science research on children and television. In addition to available staff expertise, they have relied on the insights and suggestions of a panel of social science advisors, who assisted in understanding and synthesizing the existing research and in drawing appropriated conclusions on policy related issues.

PB81-108755 PC **A14**/MF **A01**
Federal Communications Commission, Washington, DC. Office of Plans and Policy.
Television Programming for Children: A Report of the Children's Television Task Force. Volume 4: Children's Programming, 1973-74 and 1977-78,
Susan C. Greene, Brian F. Fontes, Lois E. Wright, and Florence Setzer. Oct 79, 322p
See also Volume 3, PB81-108748 and Volume 5, PB81-108763.
Also available in set of 5 reports PC E99, PB81-108771.

The purpose of the research project summarized here was to compare the amount and scheduling of children's television programs for two TV seasons, 1973-74 and 1977-78. These two seasons were selected since 1973-74 is one season before and 1977-78 is the most current complete season after adoption of the Federal Communications Commissions's 1974 Children's Television Programs: Report and Policy Statement (1974

Report). Three questions guided the research: (a) Are there more children's programs available now than prior to the adoption of the 1974 Report; (b) Is more time devoted to children's programming now than prior to the adoption of the 1974 Report; and (c) Is there a more equitable distribution of children's programs throughout the week now than prior to the adoption of the 1974 Report.

PB81-108763 PC **A15**/MF **A01**
Federal Communications Commission, Washington, DC. Office of Plans and Policy.
Television Programming for Children: A Report of the Children's Television Task Force. Volume 5: Supplemental Research Papers,
Oct 79, 341p
See also Volume 4, PB81-108755.
Also available as set of 5 reports PC E99, PB81-108771.

The document looks at alternatives to commercial television, including public television, commercial and noncommercial radio, cable television and related technologies, and the emerging video industry. It seeks to provide information that will help the Commission determine whether diversity in children's programming can be achieved by encouraging program development and distribution in these alternative media and technologies.

PB81-108821 PC **A03**/MF **A01**
Telesensory Systems, Inc., Palo Alto, CA.
Study of the Practical Real-Time Implementation of High-Performance Text-to-Speech Translation Based on the MIT (Allen/Klat) Rule Programs.
Final technical rept.,
James L. Caldwell. Sep 79, 43p NSF/RA-790523
Grant NSF-DAR78-03049

Development of a system capable of generating high quality speech from full-word English text in real time, is reported. This system is based upon rules comprising the MIT Modular Speech System (MSS) using a general-purpose minicomputer and special hardware. Its convenient real-time implementation requires less special hardware than anticipated. The system has achieved certain goals: (1) supplied the linguistic process for converting text into phonemes, relative to MSS; (2) programmed the text-to-speech system in PDP-11 assembly language; (3) created a new 'operating system' which allows several linguistic processes to execute concurrently in order to create the effect of a 'pipeline operation' of the text-to-speech system; (4) developed special hardware for implementing the vocal tract model component of the system; and (5) successfully integrated all these elements into a working system suitable for laboratory experimentation. Subjective evaluation of the synthetic speech generated by this system is underway. Current test results are encouraging but indicate directions for continuing refinement of the system.

17D. Electromagnetic and Acoustic Countermeasures

PATENT-4 215 344 Not available NTIS
Department of the Air Force Washington DC
Multiple Channel Electronic Countermeasures Radar Receiver.
Patent,
Calvert F. Phillips, Jr. Filed 15 Nov 63, patented 29 Jul 80, 5p AD-D007 446/8, PAT-APPL-324 138
Supersedes PAT-APPL-324 138-63.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A multiple channel electronic countermeasures radar receiving system comprising: source means for supplying periodic echo pulses beat to the intermediate frequency of the system and combined with jamming noise of variable frequency distribution, first receiver means fed by said source means and having a predetermined bandwidth centered on the intermediate frequency for limiting sharply to a fairly constant level signals from said source means which exceed a given amplitude, second receiver means fed by said source means and tuned to said intermediate frequency for limiting according to a logarithmic expression signals from said source means which exceed said given amplitude, frequency selective means included in said first receiver means for generating a first voltage defining random noise distribution at frequencies extending over the range of said bandwidth and generating a second voltage defining random noise distribution at frequencies offset from said intermediate frequency by a predetermined amount, video utilization means, and gate means controlled by said frequency selective means for gating the output of said first receiver means to said video utilization means in response to said first voltage and gating the output of said second receiver means to said video utilization means in response to said second voltage. (Author)

17E. Infrared and Ultraviolet Detection

AD-A089 152/3 PC **A02**/MF **A01**
Army Engineer Topographic Labs Fort Belvoir VA
Instrumented Test Site for Infrared Backgrounds,
A. O. Poulin, and A. E. Krusinger. Jul 80, 13p
Rept no. ETL-R010
Presented at the Meeting of the IRIS Specialty Group on Targets, Backgrounds, and Discrimination, 26-27 Aug 80.

A test site for the study of soil moisture and infrared backgrounds has been established at Ft. Belvoir, VA., A computer-controlled, tower-mounted radiometer (8-14 um) measures the radiance of four test plots, and a 100-channel data system measures environmental parameters. Some test results presented. (Author)

AD-A089 302/4 PC **A03**/MF **A01**
Arizona Univ Tucson Dept of Chemistry
Determination of the Ultraviolet and Visible Spectral Response of a Charge - Injection Device Array Detector.
Interim rept.,
H. A. Lewis, and M. B. Denton. Aug 80, 28p Rept no. TR-25
Contract N00014-75-C-0513

The potential of charge-injection device (CID) electronic cameras as multichannel spectroscopic detectors is discussed. Data is presented giving the UV/visible spectral response of five CID sensors. This data shows that these sensors have the ultraviolet response necessary for their application as detectors in elemental analysis. (Author)

AD-A089 379/2 PC **A09**/MF **A01**
Avco Everett Research Lab Inc Everett MA
AMOS Phase IV Annual Report.
Interim rept. 1 Jan 79-31 Dec 79,
J. Chapman, and P. McCormick. Jun 80, 193p
AERL-TR-1043, RADC-TR-80-186
Contract F30602-78-C-0061, ARPA Order-2837

This report summarizes the activities which have occurred at the ARPA Maui Optical Site (AMOS) during 1979. These activities have taken advantage of the AMOS facility which was developed by ARPA and now serves as a multi-purpose advanced optical testbed. This report contains a complete summary of the development of AMOS, a description of the assets available and summarizes the major accomplishments.

17G. Navigation and Guidance

AD-A089 162/2 PC **A05**/MF **A01**
Facility Checking Squadron (1866th) (AFCS) Scott AFB IL
TRACALS Evaluation Report. SSILS Initial Evaluation Report, Little Rock AFB, Arkansas, 2-11 June 1980.
Final rept.,
Harvey J. Leister, and Darrel W. Miller. 30 Jul 80, 91p Rept no. 80/66N-214

This report presents the results of the 2-11 June 1980 TRACALS Evaluation of the Little Rock AFB AN/GRN-27 SSILS serving Runway 25. The evaluation was conducted to determine the capabilities and limitations of the system in its installed environment. Results presented in this report can be used as a guide for anticipated performance until there is a significant change in ground equipment, siting environment, screening or operational use. (Author)

AD-A089 168/9 PC **A06**/MF **A01**
Naval Research Lab Washington DC
Summary Report on NRL Participation in the Microwave Landing System Program.
Memorandum rept.,
J. Paul Shelton, and James K. Hsiao. 19 Aug 80, 107p Rept no. NRL-MR-4305
Contract DOT-FA75WAI-556

This report summarizes activity by the Radar Devision of the Naval Research Laboratory in support of the Microwave Landing System program in the time period May 1975 through September 1979. This technical support was primarily associated with the ground scanning antennas. Initial emphasis was on microwave optical scanning techniques. This phase of the effort resulted in significant innovative contributions, but the more pressing objectives of the program shifted to the analysis of problems associated with phased array antennas. The Naval Research Laboratory contributed to the study of phased array in several ways. Computer simulations of internal monitoring systems, which can locate failed components, were carried out. A performance simulation of a general phased array using digital phase shifters was written. The performance characteristics of digital phase shifters were measured and statistically analyzed. Several research contracts for promising phased array techniques were awarded to industrial contractors. In addition to research on the primary MLS functions, which involve scanning linear phased array antennas, NRL has studied the realization of a 360-degree scanning antenna utilizing a circular array. This report contains a nontechnical review of all activities, supported by technical appendices and a listing of reports and memoranda. (Author)

AD-A089 263/8 PC **A02**/MF **A01**
Naval Surface Weapons Center Dahlgren VA
A Derivation of the Nonlinear Platform Orientation Error Equations for an INS: With an Introduction to Rotating Coordinate Frames.
Technical rept.,
Phillip L. Young. Apr 80, 21p Rept no. NSWC/TR-80-104

This report documents a derivation of the nonlinear platform orientation error equations for a local level inertial navigation system (INS). These differential equations govern the Euler angles that relate the actual orientation of the INS platform axes to the ideal orientation of these axes. The derivation deals with specific coordinate representations from the outset, by explicitly including the time-dependent transformations that relate the particular coordinate frames involved in the problem. Thus, the elements of the required angular velocity vectors are obtained in a very natural fashion, and the resulting equations incorporate the transformations needed to ensure computational consistency. A tutorial description of this approach to problems involving rotating coordinate frames is included in this report. (Author)

AD-A089 277/8 MF **A01**
Coast Guard Research and Development Center Groton CT
Error Sensitivity Model.
Interim rept. no. 2,
Miles A. Millbach. Apr 80, 112p CGR/DC-8/80, USCG-D-53-80
Availability: Microfiche copies only.

A computer model was written to simulate errors associated with the Coast Guard aids to navigation positioning process with emphasis placed on finding average effects of errors in the system. A mathematical expectation approach was used to model random system elements. The model routines

have been designed to study specific positioning situations or, by use of Monte Carlo Methods, a variety of situations as a group. The model was designed for use in planning within the aid positioning macrostructure. For planning purposes, the probability that the resulting position lies within a specific circular region is a meaningful measure of positioning success. The model was exercised for numerous cases and offers a priority listing of errors. (Author)

AD-A089 317/2 PC **A03**/MF **A01**
MITRE Corp McLean VA METREK Div
Feasibility of a Separate Short Runway for Commuter and General Aviation Traffic at Denver,
John D. Garner. May 80, 47p MTR-80W00034, FAA-EM-80-4
Contract DOT-FA80WA-4370

An analysis is made of the feasibility of a short, separate runway for general aviation at Denver's Stapleton International Airport and how it may be facilitated by FAA Engineering and Development products. General aviation is defined as private, corporate, and fixed base operators (flight schools and air taxis), and commuter airlines. The analysis is for Instrument Meteorological Conditions using current ATC procedures and consists of: runway placement, obstacle clearance, location of navigational aids, airspace design to segregate aircraft by type to two separate parallel runways, and the design of taxi patterns to allow unimpeded movement of ground traffic. Details of ILS siting such as terrain and multipath problems are not addressed. (Author)

AD-A089 384/2 PC **A05**/MF **A01**
Facility Checking Squadron (1866th) (AFCS) Scott AFB IL
TRACALS Evaluation Report. SSILS Initial Evaluation Report, McGuire AFB, New Jersey, 13-23 May 1980.
Final rept.,
Joseph P. Coyle. 20 Aug 80, 88p Rept no. 80/66N-213

This report presents the results of the 13-23 May 1980 TRACALS evaluation of the McGuire AFB AN/GRN-27 Solid State Instrument Landing System (SSILS) serving Runway 06. The evaluation was conducted to determine the capabilities and limitations of the system in its installed environment. Results presented in this report can be used as a guide to anticipated performance until there is a significant change in ground equipment, siting environment, screening or operational use.

AD-A089 385/9 PC **A03**/MF **A01**
Automation Industries Inc Silver Spring MD Vitro Labs Div
Recommended Short-Term ATC Improvements for Helicopters. Volume III. Operational Description of Experimental LORAN-C Flight Following (LOFF) in the Houston Area.
Final rept.,
Tirey K. Vickers, and D. J. Freund. Apr 80, 31p FAA-RD-80-88-VOL-3
Contract DOT-FA79WA-4279
See also AD-A089 435 and Volume 1, AD-A089 521.

The recommended Short Term ATC Improvements for Helicopters are documented in three volumes. This volume (III) provides the complete Operational Description of the Experimental Loran Flight Following (LOFF) in the Houston Area. It describes both airborne and ground components and states the objectives that are being sought in the experiment.

AD-A089 407/1 PC **A03**/MF **A01**
Automation Industries Inc Silver Spring MD Vitro Labs Div
Preliminary Test Plans of ATC Concepts for Longer Term Improvement (Helicopter Operations Development Program).
Final rept.,
D. J. Freund, and T. K. Vickers. May 80, 50p FAA-RD-80-87
Contract DOT-FA79WA-4279

Test and simulation planning is documented for longer-term improvements in helicopter ATC concepts, which are classified into the following categories: (1) Offshore Route Structure in the Gulf of Mexico, (2) Secondary Radar, (3) Analysis of Navigation Errors in the Gulf, (4) Offshore Surveillance and Communications to 300 NM Range, (5) Real-Time Reporting of Aircraft-Derived Position, (6) VHF Communications Study in the CONUS, (7) ATC Implications of Alternate Airports for Helicopters, and (8) Wake Vortex Separation. (Author)

AD-A089 408/9 PC **A04**/MF **A01**
MITRE Corp McLean VA METREK Div
Analysis of Potentially Correctable Landing Delays at Atlanta,
Bela P. Collins. Nov 79, 65p MTR-79W00415, FAA-EM-79-23
Contract DOT-FA80WA-4370

The Local Flow Traffic Management order (DOT/FAA 7110.72), dated 15 November 1976, provided for the establishment of local procedures, at designated airports (16 initially), that would assist aircraft operators in minimizing fuel usage. These local procedures would be predicted on the aircraft performing a profile descent in conjunction with en route metering. This report presents the results of a field data collection and analysis of arrival traffic flows into the Atlanta-Hartsfield International Airport. The purpose of the analysis was to quantify the effect of traffic flow on runway utilization and to identify avoidable delays. Recommendations to improve the flow of traffic are also discussed. (Author)

AD-A089 430/3 PC **A03**/MF **A01**
Automation Industries Inc Silver Spring MD Vitro Labs Div
Proposed ATC System for the Gulf of Mexico, Helicopter Operations Development Program.
Final rept.,
D. J. Freund, and T. K. Vickers. Nov 79, 36p FAA-RD-80-85
Contract DOT-FA79WA-4279

A helicopter ATC system for the Gulf of Mexico is set forth. It embodies a concept of evolutionary growth in four phases: (1) The Present System (period of use: 1980) -- IFR navigation is obtained primarily with Loran-C, or VLF/OMEGA. Back-up systems are ADF and Airborne Weather Radar. VOR/DME is used over land. ATC is by procedural control and separation standards because no radar or other surveillance system is available off shore; (2) LOFF (Loran-C Flight Following) (Period of Evaluation: 1981) -- The LOFF system is placed in operation for experimentation and evaluation. While ATC is still performed by procedural control, LOFF will assist ground controllers by reducing workload, improving flexibility, etc. Experiments will also be performed on secondary radar systems (ATCRBS & VLATME) to provide surveillance; (3) Augmented LOFF (Period of use: 1983 and beyond) -- IFR helicopters will be able to fly direct, offset or segmented RNAV routes. ATC will be essentially equivalent to the NAS. Navigation by Loran-C will expand. Surveillance will be by LOFF and/or secondary radar. Area of control will be 1,500' to 10,000' over entire Gulf, and (4) RNAV Traffic Control (Period of use: 1985 and beyond) -- IFR helicopters will be able to use any of a number of certified navigation systems. ATC systems will adapt to varying accuracies of these systems. ATC will be based on surveillance provided by aircraft reporting of position information and/or secondary radar. Separation standards will be reduced and be equivalent to Northeast Corridor.

AD-A089 435/2 PC **A03**/MF **A01**
Automation Industries Inc Silver Spring MD Vitro Labs Div
Recommendations for Short-Term Simulation of ATC Concepts. Helicopter Operations Development Program.
Final rept.,
D. J. Freund, and T. K. Vickers. Feb 80, 44p FAA-RD-80-86
Contract DOT-FA79WA-4279
See also Rept. no. FAA/RD-78-150, AD-A072 793.

A number of recommendations from a previous helicopter air traffic control (ATC) study (See Report FAA-RD-78-150) were examined. Those which appeared to have potential for early implementation were selected for further testing. The selected recommendations included: (1) dual-fix holding patterns to save airspace; (2) speed control procedures and short approach paths to save fuel; (3) various methods of reducing separation in order to increase airport or heliport capacity. Under item 3 above, a rationale for utilizing existing parallel approaches of helicopters and CTOL aircraft was presented for consideration. Extensive use of flight simulation and ATC simulation was recommended in order to reduce the time and cost of evaluating the potential improvements. The steps of the recommended simulation program were arranged in the order of ascending cost, to learn as much as possible about the subject as quickly as possible and to weed out or revise impractical solutions before they reach a more expensive stage of evaluation or development. A detailed simulation program was prepared using a modified factorial design in order to isolate the effects of changes in various parameters. (Author)

AD-A089 440/2 PC **A05**/MF **A01**
IIT Research Inst Annapolis MD
The Discrete Address Beacon System/Air Traffic Control Radar Beacon System/ATCRBS IFF Mark XII System (DABS/ATCRBS/AIMS) Performance Prediction Model.
Final rept.,
C. Randall Crawford, and C. Wayne Ehler. Apr 80, 80p ECAC-PR-77-061, FAA-RD-79-88
Contracts F19628-78-C-0006, DOT-FA70WA1-175

The Discrete Address Beacon System (DABS) is to be gradually phased into the existing Air Traffic Control Radar Beacon System (ATCRBS) in the 1980's. The DABS selective address feature is designed to alleviate the ATCRBS problems of over-interrogation and synchronous garble. The FAA requested that the Electromagnetic Compatibility Analysis Center (ECAC) develop a computer model with the capability to predict mutual interference arising in a mixed secondary-surveillance radar environment. The nature of the DABS interrogation schedule required that the model be a time-event store simulation. The model inputs are selected from the ECAC data base and consist of the characteristics of a ground and air deployment of sensors and transponders. Detailed characteristics of a sensor-of-interest (So) are among the inputs. The model output is primarily a record of the events that were predicted to occur during a simulation period. The performance of each transponder is described by its reply history during the time in which the equipped aircraft is in the So mainbeam. The fruit rate at the So is predicted, and the performance of the subject sensor is represented by the results of DABS transactions and ATCRBS target evaluations. Other summary outputs are available from the model, including interrogation rates, sidelobe suppression rates, and the identity of equipments that cause observable interference. (Author)

AD-A089 441/0 PC **A05**/MF **A01**
Automation Industries Inc Silver Spring MD Vitro Labs Div
Recommended Short-Term ATC Improvements for Helicopters. Volume II. Recommended Helicopter ATC Training Material.
Final rept. Aug 79-Apr 80,
Tirey K. Vickers, and D. J. Freund. Nov 80, 82p FAA-RD-80-88-VOL-2
Contract DOT-FA79WA-4279
See also Volume 3, AD-A089 385.

The recommended Short Term ATC Improvements for Helicopters are documented in three volumes. This volume provides complete training material for helicopter ATC. It contains major sections on Helicopter Capabilities and Limitations, on Helicopter Navigation and on Helicopter Control Procedures.

AD-A089 497/2 PC **A03**/MF **A01**
Rome Air Development Center Griffiss AFB NY
HECTIC - A LORAN Grid Computation Program for Irregular Terrain,
John L. Heckscher, and Eli J. Tichovolsky. Feb 80, 50p Rept no. RADC-TR-79-354

This report provides documentation for the computer program HECTIC which calculates LORAN time-difference coordinates over rough terrain. Basic equations are given and the various terms

are defined. The program system flow is outlined, and a User's Guide describes the input card, database tape, and printed output formats. A complete listing of the program is given. (Author)

AD-A089 521/9 PC **A03**/MF **A01**
Automation Industries Inc Silver Spring MD Vitro Labs Div
Recommended Short-Term ATC Improvements for Helicopters. Volume I. Summary of Short-Term Improvements.
Final rept.,
Tirey K. Vickers, and D. J. Freund. Aug 80, 48p FAA-RD-80-88-VOL-1
Contract DOT-FA79WA-4279
See also Volume 2, AD-A089 441.

A summary report is made of all improvements studied. Improvements are categorized as to those that can be recommended for immediate operational consideration or use and those that require limited short term simulation or test. The recommendations for immediate use include: (1) Helicopter ATC training material, (2) Operational Description of Loran Offshore Flight Following (LOFF), (3) Recommendations concerning military training routes and (4) Survey data for use in Gulf communications and route structure planning. The recommendations for short term simulation include: (1) Dual waypoint holding patterns, (2) other holding patterns and (3) shortened entry procedures for intercepting final approach path.

AD-A089 523/5 PC **A05**/MF **A01**
Coast Guard Washington DC Office of Research and Development
Magnetic Sensor Feasibility Test for Coast Guard Vessel Traffic Services.
Final rept.,
T. M. Drown. Aug 80, 76p Rept no. USCG-D-51-80

The Coast Guard Office of R & D has an on-going project to test the feasibility of using various sensors in the monitoring of vessel traffic in existing Vessel Traffic Service (VTS) operating areas. This report describes the effort involved in testing magnetic sensors. The report contains a description of both the sensor system configuration and the results of feasibility tests that were performed in Houston, Texas and Sault Ste Marie, MI. (Author)

AD-A089 598/7 PC **A03**/MF **A01**
Charles Stark Draper Lab Inc Cambridge MA
Materials Research for Advanced Inertial Instrumentation. Task 1. Dimensional Stability of Gyro Structural Materials.
Technical rept. no. 2, 1 Oct 78-30 Sep 79,
J. McCarthy, and F. Petri. Jun 80, 38p Rept no. R1388
Contract N00014-77-C-0388
See also Rept. no. R-1231, AD-A065 499.

Methods of microyield strength testing are described. The results of microyield strength measurements on hot isostatically pressed beryllium are presented as well as preliminary TEM examination of material in the as-pressed condition. Error trend data from instrument test is compared to errors predicted from a postulated microcreep law and uniaxial microcreep data. Results of creep analysis on a simple structural shape are presented. (Author)

AD-A089 611/8 PC **A04**/MF **A01**
IIT Research Inst Chicago IL
Impact of the Discrete Address Beacon System (DABS) on Air Traffic Control Radar Beacon System (ATCRBS) Performance in Selected Deployments.
Final rept.,
T. Keech, and G. Fleming. Apr 80, 56p FAA-RD-80-93, ECAC-CR-79-127
Contract F19628-78-C-0006

A computer analysis was conducted to investigate the effect of the proposed Discrete Address Beacon System (DABS) on the Air Traffic Control Radar Beacon System (ATCRBS) in a future (1982) Los Angeles, CA, air traffic environment. The performance of ATCRBS was examined at two sites, both with (a) the existing all-ATCRBS ground environment and (b) a mixed ATCRBS/DABS ground environment (using various levels of DABS channel activity). It was observed that, in general, DABS operations will not affect the ability of ATCRBS interrogators to perform their air traffic control function of reliably detecting aircraft. (Author)

AD-A089 615/9 PC **A13**/MF **A01**
Analytical Systems Engineering Corp Burlington MA
North Atlantic OMEGA Navigation System Validation.
Final rept. 3 Aug 79-21 Jul 80,
L. W. Campbell, T. M. Servaes, and E. R. Grassler. 21 Jul 80, 280p ASECR-79-125, ONSOD-01-80
Contract DOT-CG-903591-A

The OMEGA Navigation System provides a worldwide enroute positioning capability from eight transmitting stations. Although the operational transmitting stations now provide useful navigation signals, the system will not be declared fully operational until the validation program is completed in 1985. The validation program is being accomplished on a regional basis through a measurement process conducted by the U.S. Coast Guard. The North Atlantic is the second region to be validated. The data base for the North Atlantic Validation consisted of LOP Phase measurements from 36 stations of the OMEGA Navigation System Operations Detail (ONSOD) worldwide monitor network and signal amplitude measurements, both ground and airborne, throughout the area collected by the Naval Ocean Systems Center (NOSC). These data were supplemented with integrated OMEGA/Satellite shipboard measurements and numerous OMEGA measurements and observations from ship and aircraft users, both civilian and military, from several countries.

N80-31380/2 PC **A06**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Flight Div.
A Simulation Investigation on the Feasibility of Curved Approaches under Microwave Landing System (Mls) Guidance.
L. J. J. Erkelens. 20 Sep 78, 101p NLR-TR-78035-U
Contract RB-RLD-1978-2.4
Revised.

A flight simulator was used to investigate the utility of seven laterally curved approaches with various turn angles and final intercept altitudes, executed with a B-747 aircraft. Three weather situations were included, with winds of 15 m/sec and wind shears of 0.17 m sec/m. A minimum cloud base of 30.5 m was used. A flight director operating in the instrument landing system tracking mode and supplied with minor modifications in the roll bar drive was used as primary guidance instrument. Additional provisions were made to enable the pilot to monitor the approach. It was found that curved approaches with turn angles up to 180 deg can be carried out safely provided that the turn completion altitude is not much less than 305 m. Special provisions are needed with respect to the autopilot/flight director drive to achieve accurate tracking on the curved segment in strong wind conditions.

N80-31439/6 PC **A05**/MF **A01**
Lockheed Electronics Co., Houston, TX. Systems and Services Div.
TACAN Operational Description for the Space Shuttle Orbital Flight Test Program.
C. L. Hughes, and P. J. Hudock. Nov 79, 90p NASA-CR-160775, LEC-13790
Contract NAS9-15800

The TACAN subsystems (three TACAN transponders, six antennas, a subsystem operating program, and redundancy management software in a tutorial form) are discussed and the interaction between these subsystems and the shuttle navigation system are identified. The use of TACAN during the first space transportation system (STS-1), is followed by a brief functional description of the TACAN hardware, then proceeds to cover the software units with a view to the STS-1, and ends with a discussion on the shuttle usage of the TACAN data and anticipated performance.

PB81-106262 PC **A21**/MF **A01**
National Ocean Survey, Rockville, MD.
United States Coast Pilot 7, Pacific Coast: California, Oregon, Washington, and Hawaii (Sixteenth Edition).
Jun 80, 479p NOAA-80082501

The National Ocean Survey Coast Pilots are a series of nine nautical books that cover a wide variety of information important to navigators of U.S. coastal and intracoastal waters, and the water of the Great Lakes. Most of this book information cannot be show graphically on the standard nautical charts and it not readily available elsewhere. Coast Pilot subjects included navigation regulation, outstanding landmarks, channel and anchorage peculiarities, dangers, weather, ice, freshets, routes, pilotage, and port facilities. This volume of Coast Pilot 7, cancels the Fifteenth (June 1979) edition. It includes information on: San Diego to point Arguello, California, Channel Islands, California; Point Arguello to San Francisco Bay, California; San Francisco Bay, California; San Francisco Bay to Point St. George, California; Chetco Rier to Columbia River, Oregon; Columbia River Oregon; and Washington; Columbia River to Strait of Juan de Fuca, Washington; Straits of Juan de Fuca and Georgia, Washington; Puget Sound, Washington; and Hawaii.

PB81-109365 PC **A13**/MF **A01**
National Ocean Survey, Rockville, MD.
United States Coast Pilot 8. Pacific Coast Alaska: Dixon Entrance to Cape Spencer (Fourteenth Edition).
Jun 80, 299p NOAA-80090812

This volume of Coast Pilot 8, Pacific Coast Alaska, Cancels the Thirteenth (June 1978) Edition. Coast Pilot subjects include navigation regulations, outstanding landmarks, channel and anchorage peculiarities, dangers, weather, ice, freshets, routes, pilotage, and port facilities. Coast Pilot 8 gives information on Alaska--Dixon Entrance to Cape Spencer, Dixon Entrance to Ketchikan, Claraces Strait, Dixon Entrance to Wrangell, West Coast of Prince of Wales Island, Summer Strait, Frederick Sound, Stephens Passage, Chatham Strait, Lynn Canal, West Coast of Baranof Island, Salisbury Sound and Peril Strait, West Coast of Chichagof and Yakobi Islands, and Cross Sound and Icy Strait.

17H. Optical Detection

AD-A089 482/4 PC **A06**/MF **A01**
Arizona Univ Tucson Optical Sciences Center
Optics for Laser Radar Cross-Section Measurements.
Final rept. 1 May 75-31 Jul 78,
William L. Wolfe, and Mitchell C. Ruda. Oct 79, 103p
Contract DAAH01-75-C-0912

The laser radar simulator optical design is described. The profile of the mirror surfaces is described in detail. Two test arrangements for analyzing the optical system were set up. These were termed the parent and system tests. These tests and the resulting test results are discussed in the text. The parent test was simply a test of the optical system before the aspheric sections of the secondary and tertiary mirrors were cored out. The system test was a test of the finished optical components in their mounts. The results of these two tests indicated that no appreciable change occurred in the optics due to the coring and both the parent and system tests show that the optical system is performing within the required tolerances. Finally, a detailed step-by-step alignment procedure for the optics is given. (Author)

17I. Radar Detection

AD-A089 196/0 PC **A04**/MF **A01**
Northeastern Univ Boston MA Electronics Research Lab
A Radiating Cable Intrusion Detection System.
Final technical rept. 18 Sep 78-3 Dec 79,

Spencer J. Rochefort, Raimundas Sukys, and Norman C. Poirier. Jun 80, 51p RADC-TR-80-175 Contract F19628-78-C-0160

This report describes the development of a radio frequency intruder detection system intended to protect high value individual resources. The work included some modifications of an already existing system as well as the development of a new instrument. The mechanism of the interaction between the single radiation wire system and the intruder has not as yet been fully understood. Therefore, the emphasis in both of the tasks was placed on the development of a data gathering research tool rather than on the production of an operational system. The original intent was to demonstrate only the feasibility of an area intrusion detection system using radiation coaxial cable, but in the continuous process of data gathering to determine the RF field characteristics of a single wire intrusion detection system, the device was also used in conjunction with other instruments, to make measurements during field operations. In parallel with these modifications another system design was considered. In the first part of this report some of the modifications of the previously constructed instrument are described. The circuit diagrams shown should be viewed in conjunction with the circuit descriptions presented in Reference 1. The rest of the report is devoted to the description of the latest instrument. Since the design of the switchable instrument did not proceed beyond the advanced planning stages no description of that system is presented.

AD-A089 564/9 PC **A02**/MF **A01**
MARK Resources Inc Marina Del Rey CA
Simulated Track Performance of Extended Target Model Implemented via Tapped-Delay Line.
Technical note,
R. L. Mitchell. 19 Dec 77, 9p Rept nos. MRI-149-2, MRI-TN-105-030
Contract DAAK40-78-C-0031

A simulation was conducted of an extended target model implemented by means of a tapped-delay line with a tap spacing of 50% of the receiver range resolution. An early/late gate track was also simulated, both with and without the 'dither' scheme used to reduce glint. The results are positive: very little tracking error is introduced by the discrete tap arrangement. (Author)

AD-A089 565/6 PC **A02**/MF **A01**
MARK Resources Inc Marina Del Rey CA
Range Gate Response for Interim System.
Technical note,
R. L. Mitchell. 28 Dec 77, 6p Rept nos. MRI-149-4, MRI-TN-105-031
Contract DAAK40-78-C-0031

It has been assumed that the range gate response in the receiver is triangular for the interim system being simulated on the RFSS. In this memo we compute a more realistic response that is based on the finite IF bandwidth of 20 MHz. We also provide a listing of a subroutine that can be used in the extended target simulation program to compute the range gate response. (Author)

AD-A089 566/4 PC **A02**/MF **A01**
MARK Resources Inc Marina Del Rey CA
Another Method of Generating Glint.
Technical note,
R. L. Mitchell, and G. W. Lank. 30 Dec 77, 6p Rept nos. MRI-149-5, MRI-TN-105-032
Contract DAAK40-78-C-0081

The baseline method of computing angle glint offsets for the Distributed Sources Generation System is based on the concept of a glint centroid. In this memo, we derive an alternate method that is simpler to implement and somewhat more general. Let us assume the one-dimensional geometry where the monopulse receiver is sensitive to only the azimuth angle. We define theta(0) as the angle from the boresight axis to a reference point on the extended target (the c.g., for example), and alpha (i) as the angle of the i-th scatterer from the reference point. (Author)

AD-A089 569/8 PC **A02**/MF **A01**
MARK Resources Inc Marina Del Rey CA
Polarization Diversity in Medium-Range Extended Target Model Requires Six RFSS Channels.
Technical note,
R. L. Mitchell. 6 Jan 78, 3p Rept nos. MRI-149-8, MRI-TN-105-035
Contract DAAK40-78-C-0031

Without any consideration of target depolarization, three RFSS channels are required to simulate an extended target with the medium-range target model derived by Mott (see MRI Report 132-44). With target depolarization, six RFSS channels are required, two on each polarization component of the three horns making up the triad.

AD-A089 573/0 PC **A02**/MF **A01**
MARK Resources Inc Marina Del Rey CA
Limiting Range for Medium-Range Target Model.
Technical note,
R. L. Mitchell. 21 Mar 78, 11p Rept nos. MRI-149-15, MRI-TN-105-039
Contract DAAK40-78-C-0031

A medium-range target model was developed with N point scatterers, where each scatterer can have an RCS that is aspect dependent. The medium-range constraint assumes that all scatterers on the target are in the linear region of the monopulse receive beam, and all scatterers are illuminated with a constant gain by the transmit beam. The purpose of this constraint is to remove the sensor pointing angles from the real-time computation. In other words, the signal that is generated on the RFSS array is independent of the sensor pointing angles. At shorter ranges where the transmit beam is no longer uniform across the target, or where the monopulse difference beam is not linear, the pointing angles of the sensor beam must be known so that the variable weighting can be implemented in the real-time simulation; moreover, the signals that would be received on each monopulse channel must be separately simulated and radiated into specific points on the receive beam so that each channel receives the proper signal and rejects the others.

AD-A089 580/5 PC **A02**/MF **A01**
MARK Resources Inc Marina Del Rey CA
Bistatic Clutter - Proposed Model for Near Term.
Technical note,
R. L. Mitchell. 22 Jun 78, 3p Rept nos. MRI-149-25, MRI-TN-105-047
Contract DAAK40-78-C-0031

With the present configuration of the RFSS it is possible to simulate realistic clutter for a semi-active missile seeker system. The proposed model will be based on homogeneous terrain so that it will be possible to precompte certain parameters that describe the Doppler spectrum of the clutter signal as a function of the engagement geometry. The basic methodology is discussed, although much research still must be done to relate the clutter parameters to the specific engagement geometry. The goal of the simulation will be to create a signal that has the proper Doppler spectrum in terms of shape and location. Energy will be generated at the proper spectral band that is a function of the engagement geometry, and considerable care will be taken to avoid generating energy in those spectral bands where there is no clutter. Less emphasis will be placed on generating the 'correct' statistics of the clutter since this aspect of the problem is still controversial and it is more costly to simulate non-Rayleigh signals. The nonhomogeneous nature of clutter, while it represents more realism, is an unwarranted complexity at this stage of hardware-in-the-loop simulation technology. (Author)

PATENT-4 213 122 Not available NTIS
Department of the Air Force Washington DC
Intrusion Detection System.
Patent,
Walter Rotman, Nicholas V. Karas, Ronald L. Fante, and Peter R. Franchi. Filed 23 Aug 78, patented 15 Jul 80, 9p AD-D007 439/3, PAT-APPL-936 159
Supersedes PAT-APPL-936 159-78, AD-D005 366.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An intrusion detection system utilizes a radio frequency radiative system whose near electromagnetic field is monitored by receiving devices is disclosed. This system responds, in a measurable way, to any disturbance of the near electromagnetic field by physical intrusion.

PATENT-4 213 123 Not available NTIS
Department of the Air Force Washington DC
Integral Enable- Disable Means for Guided Wave Radar Intrusion Detector System Portals.
Patent,
J. Leon Poirier. Filed 7 Feb 79, patented 15 Jul 80, 6p AD-D007 440/1, PAT-APPL-6-010 093
Supersedes PAT-APPL-6-010 093, AD-D005 932.
Availability: This Govenment-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The intrusion detection capability of a guided wave radar intrusion detection system is selectively disabled in certain areas, such as gates or portals to permit ingress and egress of personnel and vehicles without affecting overall system performance and without requiring an independent detection system. This is realized by means of an integral system portal enable-disable device. Guided wave radar intrusion detection systems employ two parallel leaky transmission lines, one transmitting and the other receiving radar signals. Violation of the area between the leaky transmission lines by an intruder results in a signal that indicates the occurrence and its location. Gate areas are remotely enabled or disabled by a switching circuit that switches a segment of non-radiating transmission line into or out of the transmitting leaky transmission line in each selected gate region. (Author)

PATENT-4 213 127 Not available NTIS
Department of the Air Force Washington DC
Doubly Adaptive CFAR Apparatus.
Patent,
Lanier G. Cole. Filed 31 Jan 79, patented 15 Jul 80, 4p AD-D007 441/9, PAT-APPL-6-008 144
Supersedes PAT-APPL-6-008 144, AD-D005 870.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A doubly adaptive constant false alarm rate (CFAR) apparatus utilizing a doubly adaptive detector which is based upon the use of an auxiliary parallel adaptive detector in addition to the conventional main adaptive detector. The auxiliary adaptive detector has a lower threshold setting. The threshold crossing rate of the auxilliary detector, which depends upon the clutter statistics, is used to adjust the base multiplier setting of the main detector. (Author)

18.

NUCLEAR SCIENCE AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

N80-32225/8 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Preliminary Experiment of Neutral Beam Injection Heating in JIPP T-2 Stellarator.
O. Kaneko, Y. Oka, H. Okamura, T. Kunibe, and T. Kuroda. Jun 80, 25p IPPJ-470

Neutral beam injection experiments are carried out in JIPP T-2, which is a hybrid device of stellarator

and Tokamak. Two neutral beam injectors are equipped tangentially in the direction of co- and counter-injections. Hydrogen neutral beams of 22 Kev, 60 KW (co-injection) and 30 KW (counter-injection) are applied to the ohmically heated stellarator plasma and also to the Tokamak plasma. The bulk ion heating efficiency for co-injection is around 1.6 eV/KW in the case of stellarator and 1.9 eV/kW in the case of Tokamak, while the heating efficiencies for counter-injection are about 1.6eV/kW in both cases. The difference between the Tokamak and stellarator is considered to be caused by the enhanced orbit loss due to the helical ripples in the stellarator.

18B. Isotopes

CEA-CONF-4641 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. des Rayonnements Ionisants.
Utilization of Cyclotron for the Production of Radionuclides for Medical Use.
C. Cimetiere, J. Leger, R. Muxart, and J. Vernois. 1979, 11p CONF-7905162-3
In French.Seminar on particle accelerators: utilization and radioprotection, Saclay, France, 14 May 1979.
U.S. Sales Only.

The various types of cyclotrons (medical cyclotrons, medium energy cyclotrons, high energy cyclotrons, proton linear accelerators) used for the production of radionuclides are reviewed. The production method of five of the most important, together with their medical use are described: iodine-123, rubidium-81, krypton-81m, thallium-201, indium-111, and gallium-67. (Atomindex citation 11:521071)

18C. Nuclear Explosions

AD-A089 170/5 PC **A05**/MF **A01**
SRI International Menlo Park CA
Debris Distribution as a Parameter in Blast/Fire Interaction.
Final rept. May 79-Jul 80,
John R. Rempel. Jun 80, 87p
Contract DCPA01-79-C-0269

By applying the principles of classical mechanics and approximating aerodynamic and ground interaction forces, a general three dimensional debris fragment transport code DEBRIS has been written. Certain field experiments using airblast originating in large H.E. explosions have been simulated and the simulated and experimental outcomes compared. While simulation of long distance or high speed transport by tumbling or sliding over ground surfaces is not satisfactory, short distance transport such as might be found following structural collapse is sufficiently realistic that DEBRIS combined with a previously developed building response code BRACOB appears ultimately capable of describing outside wall debris patterns. It is recommended that velocity dependent loss mechanisms be incorporated in DEBRIS to improve its simulation of long distance transport and that certain existing uncertainties concerning wall debris creation and transport be lessened by means of a full size or near full size field experiment. (Author)

AD-A089 191/1 PC **A05**/MF **A01**
Kaman Sciences Corp Colorado Springs CO
Development of a Dust Cloud Mass Measuring System.
Final rept. 1 Jun-31 Dec 78,
Richard K. Duke. 1 Jan 79, 87p K-79-9U, DNA-4829F, AD-E300 899
Contract DNA001-78-C-0207

This report describes the concepts, design feasibility, fabrication and testing of a dust cloud mass measuring system. The early-time (less than 2 minutes) measuring system featured an aerodynamically designed measuring canister and a helicopter delivery and sighting technique specifically designed for use on MISERS BLUFF Phase II, Events 1 and 2. The report describes the development activities and field testing. Due to operational (not technical) problems, no dust measurements were made in either of the MISERS BLUFF events. Conclusions, recommendations and a detailed drawing package of the measuring canister are also presented. (Author)

AD-A089 278/6 PC **A06**/MF **A01**
New Mexico Univ Albuquerque Eric H Wang Civil Engineering Research Facility
Computational Modeling of Simulation Tests.
Final rept.,
G. Leigh, W. Chown, and B. Harrison. Jun 80, 160p Rept no. UNM/CERF-AST-46
Contract F29601-76-C-0015

This effort modeled two types of nuclear airblast simulators, the High Explosive Simulation Technique (HEST) and the Dynamic Airblast Simulator (DABS), with hydrodynamic Computer Codes. One dimensional similarity solutions, Modified 1-D, and 2-D calculations are described. High explosive burn routines and energy deposition schemes are described. For the HEST, explosive distribution and cavity configurations were studied. For the DABS, energy deposition, calculational cell size, and a preliminary look at shock-target interactions are presented. (Author)

18D. Nuclear Instrumentation

AECL-6484 PC **A02**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River, (Ontario). Chalk River Nuclear Labs.
Measurements of the Relative Angular Efficiency of a Ge(Li) Detector: Q Sub (K) Factors and Doppler Broadening.
T. K. Alexander, J. S. Forster, G. C. Ball, and W. G. Davies. Feb 79, 17p
U.S. Sales Only.

The relative efficiency of a cylindrical Ge(Li) detector has been measured as a function of the angle of incidence and the energy of the gamma rays (660, 898, 1369, 1836 and 2754 keV), for three source-to-detector distances (4.6, 8 and 10 cm between the source and the front face of the detector container). These data are used to calculate values of the attenuation factors, Q sub (k), for use in angular distribution analysis and to calculate the Doppler broadening arising from the finite solid angle of the detector subtended to a moving source. (Atomindex citation 11:511410)

CEA-CONF-4609 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Service de Protection contre les Rayonnements.
Utilization of Nuclear Data in gamma Spectrometry. Application to Health Physics.
J. C. Zerbib. 1979, 7p
In French.
U.S. Sales Only.

Seeking nuclear data either in reference works or in files, together with the great diversity of requirements, gives rise to a few problems. In particular, it seems necessary to undertake the comparative study of the results provided. An endeavour is made to define the wishes of a user as regards the value of the items of information useful for gamma spectrometry, the three following parameters being involved: gamma energy, period and rate of gamma emission. In the case of radioactive families and in general all the daughter products, the nuclear data must be scrutinized with great care. (Atomindex citation 11:511460)

INIS-mf-5452 PC **A05**/MF **A01**
Universidad Autonoma de Zacatecas (Mexico). Escuela de Ciencias Quimicas.
Design and Construction of a Calorimeter for the Measurement of Radiation Doses in a Nuclear Reactor.
J. F. Lugo R. 1979, 97p
In Spanish.Thesis.
U.S. Sales Only.

The amount of energy deposited by the radiation in an absorber system, in radiation dose units was established, the Reactor Triga Mark III core of the Mexican Nuclear Center was used as radiation source. The calorimetric method was used, which gives us a direct measurement in energy units. The total dose was measured, that is, no difference was made between the different forms of radiation that operate with the system. A calorimeter was made with the following materials: stainless steel jacket, aluminium absorber material and thermometers of iron alloy. The calibration system was made for the heating and cooling technique, obtaining with the experimental data the value of the pseudo period constant. With that value and using the fit derived equation, the dose values were established for the G-21 position of the reactor core. It was established that the obtained dose is a function of the operation reactor time before the measurement, at the same a lot of propositions are presented in order to improve this technique, as for the used materials as to the obtaining the most fit equations. A comparison was made between the theoretical calculated dose and the experimentally obtained data with the calorimetric technique. (Atomindex citation 11:518266)

INIS-mf-5585 PC **A02**/MF **A01**
Kiel Univ. (Germany, F.R.). Mathematisch-Naturwissenschaftliche Fakultaet.
New Spectrometer for Simultaneous Measurements of Energy Distributions and Pitch-Angular Distributions of Electrons (18 KeV <= E <= 250 KeV) and Protons (30 KeV <= E <= 3300 KeV) on Board of the European Geostationary Satellite GEOS.
A. Korth. 17 Jan 76, 21p
In German.Thesis.
U.S. Sales Only.

A new magnetic spectrometer is described it is used as part of the experimental equipment of the european satellite GEOS. The spectrometer was developed to measure distribution functions f(E, alpha , t) for electrons in the energy range 18 KeV < E < 250 KeV and for protons in the energy range 30 KeV < E < 3.3 MeV. Several methods are discussed to measure pitch-angular distributions. The image characteristics of the spectrometer are analysed. Further, the scattering of electrons inside the instrument, the backscattering of electrons from detectors and all relevant background problems are considered. The detectors and the electronic components of the equipment are described in detail. (Atomindex citation 11:518263)

JINR-10-12400 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
PROSPEC Program Complex for Analysis of Two-Dimensional gamma gamma Coincidence Spectra.
N. G. Volkov, V. M. Tsupko-Sitnikov, and A. K. Churakov. 1979, 22p
In Russian.
U.S. Sales Only.

The system for automatic gamma gamma coincidence spectra analysis is developed. It could work with rough data and with data after preliminary sorting operation. The methods of the continuous peak searching and parameter determination are described. The coincidence peak volumes are found by approximating two-dimensional surface with an analytical function and using the least square method. For multiplet resolution spectra the regularization method is used. Total time for the analysis of data, represented by a coincidence spectrum of 4096x4096x4096 channels with 10 exp 7 events, is 2h for the processor with the 3x10 exp 5 operation on the ES-1040. (Atomindex citation 11:511537)

KEK-78-24 PC **A02**/MF **A01**
National Lab. for High Energy Physics, Oho (Japan).
Track Distortion Measurement of the KEK 1-M Liquid Hydrogen Bubble Chamber.
R. Sugahara, Y. Fukui, F. Ochiai, K. Takahashi, and S. S. Yamamoto. Jan 79, 24p
U.S. Sales Only.

As a part of a 210,000-picture exposure to a 6 GeV/c pi exp - beam at the KEK proton synchro-

tron in the KEK 1-m bubble chamber, about 5,000 pictures have been taken without the magnetic field in the bubble chamber with various expansion and light flash timings under various chamber pressures and temperatures. The result of the measurement of the distortion of these beam tracks without magnetic field indicates that a suitable expansion and light flash timing exists under a pressure of 4.35 ata with a dynamical pressure change of 3.96 ata at expansion, and under a temperature of 25.75 K. The average curvature of beam tracks under this condition is -0.02 +- 0.09 (100 m) exp -1 . The density of liquid hydrogen under this operation condition is 0.0625 g/cm exp 3 as obtained from the measurement of the range of the mu exp + from the decay of the stopping pi exp + , and also from the temperature of liquid hydrogen. From the exposure with magnetic field the masses of the K exp 0 and lambda are measured from the pi exp + pi exp - and pi exp - p effective mass distributions; they are 499.5 MeV and 1115.8 MeV, respectively. The standard deviation of the mass distribution is 5.2 MeV for the K exp 0 and 1.9 MeV for the lambda . By fitting the 4-c reaction pi exp - + p implies pi exp - + pi exp - + pi exp + + p, the beam momentum at the back of the bubble chamber beam window is measured to be 6.14 GeV/c. (Atomindex citation 11:508844)

LU-TP-79-6 PC **A02**/MF **A01**
Lund Univ. (Sweden).
Detection of Short-Lived Particles in Nuclear Emulsions.
G. Ingelman, B. Andersson, G. Claesson, K. Soederstroem, and I. Otterlund. Apr 79, 15p
U.S. Sales Only.

We present a method for detecting short-lived particles in nuclear emulsions. Production and decay vertices as close as 0.5 mu m can resolved. This corresponds to a lifetime of the order of 10- exp 15 s. The principle is to fit straight lines to the tracks and make a chi-square test of the hypothesis of a single vertex. This technique may be useful for detecting decays of heavy quarks. (Atomindex citation 11:511434)

NRPB-IE-15 PC **A02**/MF **A01**
National Radiological Protection Board, Harwell (England).
Summary of the Performance of Exposure Rate and Dose Rate Instruments Contained in Instrument Evaluation Reports NRPB-IE1 to NRPB-IE13.
P. H. Burgess, and W. J. Iles. Jun 79, 12p
U.S. Sales Only.

A concise summary is given of the more important performance characteristics of eleven types of radiation protection dose rate and exposure rate survey instruments which have been assessed by NRPB as part of the instrument evaluation programme and published in the NRPB-IE report series. Characteristics considered are: dynamic range of exposure rate, overload performance, response as a function of photon energy, response to beta radiation, response as a function of ambient temperature, battery life and the variation of indication during that life, response to pulsed sources of radiation, cost and availability of instruments. (Atomindex citation 11:511418)

N80-32197/9 PC **A02**/MF **A01**
Centro Informazioni Studi Esperienze, Milan (Italy). Servizio Documentazione.
Criteria for Data Elaboration of gamma Spectra of Ambient Samples Criteri di Elaborazione di Spettri gamma di Campioni Ambientali.
A. L. Traversi. Nov 79, 10p CISE-1536
Text in Italian. Presented at 21ST Aipr Congr., Palermo, Italy, 16-19 Oct. 1979.

An analysis of low frequency count gamma spectra data processing, from ambient samples measured with Ge(Li) detectors is presented. Some concepts are examined, such as peak significance and minimum detectable count for a given background. Solutions are suggested for the determination of the peak area, for the computation of the confidence interval and for transformation of counts in concentration (pCi/kg). A model is proposed for the evaluation of the efficiency curve as a function of the energy based on polynomial regression techniques.

N80-32198/7 PC **A02**/MF **A01**
Centro Informazioni Studi Esperienze, Milan (Italy). Servizio Documentazione.
Field gamma Spectrometry System with Ge(Li) Detectors Sistema Per Spettrometria gamma in Campo Con Rivelatore a Ge(Li).
N. Depasquale, and R. D. Lonati. Nov 79, 10p CISE-1537
Text in Italian. Presented at 21ST Aipr Congr., Palermo, Italy, 16-19 Oct. 1979.

The design and means of adjustment of a field gamma spectrometry system is described. The system uses position adjustable Ge(Li) detectors and a portable ionization camera. The detector resolution is high enough to discriminate the relative contribution to the total dose measured by the camera of several sources such as artificial radioactive nuclei, the gamma emmiters produced by natural series decay, and potassium 40.

PATENT-4 197 461
Not available NTIS
Department of Energy, Washington, DC.
Miniaturized Radiation Chirper.
Patent,
C. J. Umbarger, and M. A. Wolf. Filed 17 Aug 78, patented 8 Apr 80, 6p PAT-APPL-934 764
Supersedes PAT-APPL-934 764-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A miniaturized radiation chirper for use with a small battery supplying on the order of 5 volts is described. A poor quality CdTe crystal which is not necessarily suitable for high resolution gamma ray spectroscopy is incorporated with appropriate electronics so that the chirper emits an audible noise at a rate that is proportional to radiation exposure level. The chirper is intended to serve as a personnel radiation warning device that utilizes new and novel electronics with a novel detector, a CdTe crystal. The resultant device is much smaller and has much longer battery life than existing chirpers. (ERA citation 05:032732)

PATENT-4 197 462
Not available NTIS
Department of Energy, Washington, DC.
Position-Sensitive Proportional Counter with Low-Resistance Metal-Wire Anode.
Patent,
M. K. Kopp. Filed 4 Dec 78, patented 8 Apr 80, 6p PAT-APPL-966 525
Supersedes PAT-APPL-966 525-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A position-sensitive proportional counter circuit is provided which uses a conventional (low-resistance, metal-wire anode) proportional counter for spatial resolution of an ionizing event along the anode of the counter. A pair of specially designed active capacitance preamplifiers terminate the anode ends wherein the anode is treated as an RC line. The preamplifiers act as stabilized active capacitance loads and each is composed of a series-feedback, lownoise amplifier, a unity-gain, shunt-feedback amplifier whose output is connected through a feedback capacitor to the series-feedback amplifier input. The stabilized capacitance loading of the anode allows distributed RC-line position encoding and subsequent time difference decoding by sensing the difference in rise times of pulses at te anode ends where the difference is primarily in response to the distributed capacitance along the anode. This allows the use of lower resistance wire anodes for spatial radiation detection which simplifies the counter construction and handling of the anodes, and stabilizes the anode resistivity at high count rates (> 10 exp 6 counts/sec). (ERA citation 05:032733)

PTB-ND-15 PC **A03**/MF **A01**
Physikalisch-Technische Bundesanstalt, Brunswick (Germany, F.R.). Neutronendosimetrie.
Importance of Fast Neutron Scattering Cross Sections for Neutron Dosimetry in Soft Tissues.
R. Jahr, and H. J. Brede. May 79, 32p
In German.
U.S. Sales Only.

Tissue equivalent plastic materials are used for the construction of accurate neutron dosemeters. As compared to real tissue, in materials most of the oxygen content is replaced by carbon. In order to determine the dose to human tissue a kerma correction factor has to be used. It is shown that the uncertainty (corresponding to 1 delta) of the correction factor at E = 14.5 MeV amounts to at least 5.2%. An important contribution to the uncertainties results from the lack of experimental data of the exp 12 C(n, n' 3 alpha), exp 16 O(n,n'p) and exp 16 O(n,n' alpha) cross sections. These data are to be calculated by subtracting all other cross sections from the total cross section of (exp 16 O + n) and (exp 12 C + n). It is shown that the uncertainties of the kerma correction factor can be considerably reduced by an accurate measurement of the scattering cross sections of carbon and oxygen. (Atomindex citation 11:511435)

PTB-ND-16 PC **A02**/MF **A01**
Physikalisch-Technische Bundesanstalt, Brunswick (Germany, F.R.). Neutronendosimetrie.
Exposure Times and Ratio of Readings Produced by Irradiation of Thermoluminescence Dosemeters in PTB Neutron Standard Fields Between 0.1 MeV and 19 MeV.
R. Jahr, S. Guldbakke, and M. Cosack. Jun 79, 14p
In German.
U.S. Sales Only.

exp 6 LiF and exp 7 LiF thermoluminescence dosimeters (TLD) irradiated in a standard field of monoenergetic neutrons (Esub(n) = 0.1 MeV to 19 MeV), respond as well to the photon as to the neutron component of this radiation field. The ratio of the two TLD readings as well as the duration of irradiation required to obtain a preset TLD reading are calculated as a function of the neutron energy. (Atomindex citation 11:511436)

PTB-ND-17 PC **A03**/MF **A01**
Physikalisch-Technische Bundesanstalt, Brunswick (Germany, F.R.). Forschungs- und Messreaktor.
European Workshop on Neutron Dosimetry for Radiation Protection.
W. G. Alberts, M. Cosack, H. Kluge, H. Lesiecki, and S. Wagner. Sep 79, 43p
U.S. Sales Only.

The results of an irradiation experiment for neutron monitors and dosimeters for radiation protection purposes are presented. The instruments were exposed to neutrons from thermal energies up to an energy of 19 MeV using an accelerator, reactor neutron beams and radionuclide sources. The irradiation facilities and the calibration conditions are briefly described. The results are presented in both numerical and graphical form as instrument response vs. neutron energy. (Atomindex citation 11:511408)

RL-79-074 PC **A02**/MF **A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Data Acquisition System for the Leeds Infirmary MWPC X-Ray Imaging Detector.
S. Quinton, D. Gibbings, D. Jones, and H. Norton. Oct 79, 25p
U.S. Sales Only.

An electronic system is described which is designed to acquire and process data from a MWPC X-ray imaging detector. Two-dimensional information from the chamber is obtained by using cathode plane delay-line readout. A single crate CAMAC assembly is used as the chamber-computer interface. The use of control source units for the delay line scalers and TV display driver functions together with an intermediate memory in the crate allows input data rates up to 1MHz and TV display facilities without constant computer refreshing. (Atomindex citation 11:511451)

TU-Inf-05-01-79 PC **A02**/MF **A01**
Technische Univ., Dresden (German D.R.). Sektion Physik.
Calculation of the Radial Dose Distribution around the Trajectory of an Ion.
G. Pretzsch. Jan 79, 15p

In German.
U.S. Sales Only.

The dose caused in polyester by incoming protons, alpha beams, exp 127 I ions, and exp 16 O ions has been calculated as a function of the distance perpendicularly to their trajectory. Based on simplified assumptions regarding the binding state of target electrons, emission of secondary electrons and their propagation in matter, it has been found that the dose depends on the distance to the ion trajectory (R) in the form Rsup(-I), I being about 2. The calculated radial dose distributions agree well with values calculated or measured by other authors. (Atomindex citation 11:511450)

TU-Inf-05-02-79 PC **A02**/MF **A01**
Technische Univ., Dresden (German D.R.). Sektion Physik.
Fast Neutron Detection by an Organic Dielectric Track Detector.
B. Doerschel, and G. Streubel. Jan 79, 15p
In German.
U.S. Sales Only.

Using organic polymer foils as dielectric track detectors, fast neutrons are detectable by utilizing interactions occuring in the detector material. Therefore, a combination of the detectors with external radiators is not necessary. For cellulose triacetate the sensitivity has been assessed as a function of neutron energy. Measuring accuracy and the available measuring range have been determined. The fast neutron detection method described is suitable for emergency use. (Atomindex citation 11:511422)

TU-Inf-05-03-79 PC **A02**/MF **A01**
Technische Univ., Dresden (German D.R.). Sektion Physik.
Physical Fundamentals for the Development of a Neutron Personnel Dosemeter Using Dielectric Track Detectors.
B. Doerschel, and G. Streubel. Jan 79, 16p
In German.
U.S. Sales Only.

A neutron dosemeter using dielectric track detectors (cellulose triacetate foils of 140 mu m thickness) has been developed for personnel dosimetry especially useful in accident dosimetry. Energy dependence, measuring range and accuracy (+30%; -20%) of the dosemeter are given. A decreased dependence on body orientation in the neutron field and on the distance body - dosemeter could be achieved. (Atomindex citation 11:511423)

TU-Inf-05-07-79 PC **A02**/MF **A01**
Technische Univ., Dresden (German D.R.). Sektion Physik.
Heavy Ion Measurement by Chemical Detectors.
K. Huebner, G. Erzgraeber, and K. Eichhorn. Feb 79, 15p
In German.
U.S. Sales Only.

In testing the applicability of the threshold system polyvinyl alcohol/methyl orange/chloral hydrate/ sodium tetraborate to the quantitative detection of single particles, the chemical detector was irradiated with exp 4 He, exp 12 C, exp 18 O, exp 22 He ions of different LET. Detectors with 4 different borax concentrations (chloral hydrate concentration kept constant) have been irradiated. The dose causing the colour change increased linearly with the borax concentration. For equal borax concentrations this dose increases with increasing LET due to the decreasing G value of the HCl. The fluence ranges measurable with the various detector compositions are given. exp 4 He and exp 18 O ion ranges have been determined. The measured depth dose curves have been corrected because the dose is LET-dependent. The experimentally determined ranges are in good agreement with values calculated for the detector material. (Atomindex citation 11:511432)

TU-Inf-05-10-79 PC **A02**/MF **A01**
Technische Univ., Dresden (German D.R.). Sektion Physik.
Trends in Radiation Protection Measuring Techniques.
V. Schuricht. Mar 79, 8p
In German.
U.S. Sales Only.

A brief survey is given of the trends in radiation protection measuring methods. Based on observations made at the Nuclex 78 it is stated that (1) more and more complete systems are offered for radiation monitoring in nuclear power plants with microprocessors playing an important role, (2) a great deal of multipurpose pocket devices are produced, very often fitted with microprocessors, (3) dosemeter reading systems are automated to a large extent and equipped with microprocessors, (4) the halogen counter continues to be the detector most frequently applied, and (5) there are no new developments in neutron dosimetry. (Atomindex citation 11:511546)

ZfK-391 PC **A03**/MF **A01**
Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German D.R.).
Error Estimation of Fit Parameters in Analysis of Experimental gamma Spectra. The Case of a Single Peak on a Constant Background.
G. V. Vinel', and S. Matthies. Aug 79, 39p
In Russian.
U.S. Sales Only.

In part I formulas are derived for a typical case in the analysis of gamma spectra (single peak approximated by a Gaussian-curve on a constant background), which permit one to estimate the errors of the fit parameters connected with the statistics of the experimental spectrum. The problem of the error estimation is investigated too for the case of a fit break off before the minimum is reached. In part II the influence of nonlinearities in the parametrization of the model function on the error estimations is considered. The correctness of the formulae of part I is demonstrated by numerical examples. Tables of the errors of peak parameters are given for a large range of characteristics of the spectrum. (Atomindex citation 11:511536)

18E. Nuclear Power Plants

INIS-mf-5599 PC **A02**/MF **A01**
Oskarshamnsverkets Kraftgrupp A.B., Stockholm (Sweden).
Thermal Power Plant - Nuclear Power Plant-What It Means for the Local Community.
B. Christersson. 1978, 13p
In Swedish.
U.S. Sales Only.

The impact of the Oskarshamn nuclear power plant on the local community is discussed by a local administration official. Following a general description of the community and its surroundings, the planning background for the nuclear power plant is presented. The licensing procedures are then described. The administrative measures required during the construction period included housing for construction personnel and fire-fighting facilities while no roads or water supplies have been provided. No social problems have occurred and only two fires. The housing standard aimed at was high and the political events leading to slowing down of the programme have led to a surplus. The planning and environmental aspects of the plant are also discussed. (Atomindex citation 11:518704)

INIS-mf-5622 PC **A20**/MF **A01**
Junta de Energia Nuclear, Lisbon (Portugal).
Provisions Relating to Nuclear Energy. II - International Conventions.
469p
In Portuguese.
U.S. Sales Only.

This book published by the Portuguese Junta de Energia Nuclear (Nuclear Energy Commission) reproduces in Portuguese and in the original language (English or French), texts of a series of international conventions in the nuclear field and the Statutes of international nuclear organisations and undertakings. The following are among the texts included: the Statutes of the IAEA, NEA, Eurochemic; the Euratom Treaty; the Tlatelolco Treaty; the co-operation agreement between Portugal and the United States on the peaceful uses of nuclear energy. (Atomindex citation 11:518554)

INIS-mf-5623 PC **A18**/MF **A01**
Junta de Energia Nuclear, Lisbon (Portugal).
Provisions Relating to Nuclear Energy.
1970, 402p
In Portuguese.
U.S. Sales Only.

This book published by the Portuguese Junta de Energia Nuclear (Nuclear Energy Commission) contains the texts of all nuclear legislation enacted in Portugal until 1972. (Atomindex citation 11:518555)

NUREG/CR-1474 PC **A05**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Chemistry.
An Algorithm to Estimate Field Concentrations Under Nonsteady Meteorological Conditions from Wind Tunnel Experiments,
R. J. B. Bouwmeester, K. M. Kothari, and R. N. Meroney. Sep 80, 95p
Contract NRC-04-76-236

Highest concentrations at ground level are often produced from surface sources with stable atmospheric conditions and near calm winds. This report describes a weighted data methodology developed to predict surface concentrations from stationary wind-tunnel measurements and actual meteorological wind fields. Field measurements made downwind of the Rancho Seco Nuclear Power Station in 1975 have been compared against a set of wind-tunnel measurements around a 1:500 scale model of the same facilities. The weighted data algorithm was realistic in both predicting centerline concentration values as well as the horizontal spread of the plume.

NUREG/CR-1579 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Considerations on Nuclear Data Link Implementation in Relation to the Technical Support Center, Emergency Operations Facility and Safety Parameter Display System,
B. Stiefeld, and D. Jeppersen. Sep 80, 30p
SAND-80-1618

Upon the occurrence of a significant event at a nuclear plant, both the Nuclear Regulatory Commission and the licensee must carry out certain roles to mitigate possible consequences. To accomplish their respective roles effectively, both require timely data from the plant instrumentation systems. The relationship of the NRC-oriented Nuclear Data Link to the individual licensee-oriented Technical Support Centers, Emergency Operations Facilities, and Safety Parameter Display Systems have been examined with regard to implementaton of data acquisition, communication, and display requirements. The possible use of a common data acquisition processor for all four systems is discussed, along with technical considerations important in the implementation of such an approach. A common data acquisition system is not recommended but could be successfully implemented if tight control is exercised. Some of the anticipated difficulties in developing standardized data display are outlined. Duplication at the NRC Operations Center of those displays available at the reactor sites will be extremely difficult unless industry-wide standardization of display is implemented.

NUREG-0675-SUP-11 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Operation of Diablo Canyon Nuclear Power Plant, Units 1 and 2, Pacific Gas and Electric Company, Supplement No. 11. Docket Nos. 50-275 and 50-323.
Safety evaluation rept.
Oct 80, 35p
See also Supplement No. 10, NUREG-0675-SUP-10.

Supplement No. 11 to the Safety Evaluation Report for Pacific Gas and Electric Company's application for licenses to operate the Diablo Canyon Nuclear Power Station (Docket Nos. 50-275 and 50-323) located in San Luis Obispo County, California has been prepared by the Office of Nuclear

Reactor Regulation of the Nuclear Regulatory Commission. The purpose of this Supplement is to discuss the systems interaction program for seismically-induced events for the Diablo Canyon facilities.

NUREG-0684 PC **A05**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Siting, Health and Safeguards Standards.
Summary of Public Comments and NRC Staff Analysis Relating to Rulemaking on Emergency Planning for Nuclear Power Plants.
Sep 80, 100p

This NUREG provides a summary and discussions of public comments received during the expedited rulemaking to upgrade emergency preparedness around nuclear power reactor sites. The final rule was published in the Federal Register (45 FR 55402) on August 19, 1980. The information in NUREG-0684 was excerpted in the main from internal paper SECY-80-275 (June 3, 1980) which forwarded the final rule to the Commission for consideration. This document, along with NUREG-0628, NUREG/CP-0011, and the materials cited in the Final Rules, should be considered a compendium of the major issues raised in this proceeding and acted upon by the Commission.

NUREG-0732 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Answers to Frequently Asked Questions About Cleanup Activities at Three Mile Island, Unit 2.
Public information rept.
Sep 80, 40p

The document presents answers to frequently asked questions about plans for cleanup and decontamination activities at Three Mile Island, Unit 2. Answers to the questions asked are based on information in the NRC 'Draft Programmatic Environmental Impact Statement related to decontamination and disposal of radioactive wastes resulting from March 28, 1979, accident, Three Mile Island Nuclear Station, Unit 2' NUREG-0683.

18F. Radiation Shielding and Protection

INIS-mf-5451 PC **A06**/MF **A01**
Instituto Politecnico Nacional, Mexico City. Escuela Superior de Fisica y Matematicas.
Solution of Unidimensional Problems from Monoenergetics Neutrons Diffusion Through Finite Differences.
Carlos Filio Lopez. 1979, 107p
In Spanish.Thesis.
U.S. Sales Only.

A calculation program (URA 6.F4) was elaborated on FORTRAN IV language, that through finite differences solves the unidimensional scalar Helmholtz equation, assuming only one energy group, in spherical cylindrical or plane geometry. The purpose is the determination of the flow distribution in a reactor of spherical cylindrical or plane geometry and the critical dimensions. Feeding as entrance datas to the program the geometry, diffusion coefficients and macroscopic transversals cross sections of absorption and fission for each region. The differential diffusion equation is converted with its boundary conditions, to one system of homogeneous algebraic linear equations using the box integration technique. The investigation on criticality is converted then in a succession of eigenvalue problems for the critical eigenvalue. In general, only is necessary to solve the first eigenvalue and its corresponding eigenvector, employing the power method. The obtained results by the program for the critical dimensions of the clean reactors are admissible, the existing error as respect to the analytic is less of 0.5%; by the analysed reactors of three regions, the relative error with respect to the semianalytic result is less of 0.2%. With this program is possible to obtain one quantitative description of one reactor if the transversal sections that appears in the monoenergetic model are adequatedly averaged by the energy group used. (Atomindex citation 11:517990)

NUREG/CR-1620 PC **A10**/MF **A01**
Indiana Univ. at Bloomington. Inst. for Research in Public Safety.
Survey of Current State Radiological Emergency Response Capabilities for Transportation Related Incidents.
Final rept. 1 Oct 78-8 Sep 80,
Eric L. Mitter, Rex D. Hume, Frank Vilardo, E. Feigenbaum, and H. Briggs. Sep 80, 203p

The volume is the final report of a project to survey current state radiological emergency response capabilities for transportation related incidents. The survey was performed to provide the NRC with information useful in the development of guidelines for state organizations and planning for emergency response. The report includes the results of a mail and telephone survey of state emergency response officials; information gleaned from radiological emergency response plans and related official document; and some general conclusions and recommendations drawn in part from interviews conducted and site visits to selected states.

PAT-APPL-6-167 851 PC **A02**/MF **A01**
Department of the Navy Washington DC
Packaging for Ocean Disposal of Low-Level Radioactive Waste Material.
Patent Application,
Harvey H. Haynes, and Robert D. Rail. Filed 14 Jul 80, 18p AD-D007 449/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention is basically a packaging system that stores conventional 55-gallon drums of low-level radio-active waste. The package consists of a concrete shell structure that houses the drums and a filler material that surrounds the drums. The filler material is placed around the drums as a dry mixture of sand and cement. After transport to the ocean site and just prior to ocean implacement, the void volume in the filler material is saturated with water. Then during free-fall descent to the seafloor, a pressure compensation means is used to equalize pressures inside and outside the packaging structure. Once the package is on the seafloor, the filler material hardens to produce a highly secure barrier to any leaking of radioactive waste. (Author)

TU-Inf-05-27-79 PC **A02**/MF **A01**
Technische Univ., Dresden (German D.R.). Sektion Physik.
Gamma Radiation Field Measurements at Primary Coolant Circuits and Steam Generators of Nuclear Power Plants with WWER-440 Type Reactors.
R. Kunze, W. Gerullis, F. Guehne, K. Prokert, and V. Schuricht. 1979, 12p
In German.
U.S. Sales Only.

For radiation protection purposes, measurements of gamma radiation fields have been performed with thermoluminescent dosemeters (CaF sub 2 :Mn-PTFE) around a part of a primary coolant circuit and at a steam generator. Both radiation fields have to be considered for shielding calculations. The measured and calculated values were found to be in good agreement in case of the primary circuit. The values obtained for the steam generator showed differences due to superposition of both radiation fields and were therefore not suitable for radiation protection calculations. (Atomindex citation 11:511364)

18G. Radioactive Wastes and Fission Products

INIS-mf-5570 PC **A07**/MF **A01**
Sovet Ekonomicheskoi Vzaimopomoshchi, Moscow (USSR). Postoyanniya Komissiya po Ispol'zovaniyu Atomnoi Energii v Mirnykh Tselyakh.
Research on Desactivation of Liquid, Solid and Gaseous Radioactive Wastes and Decontamination of Surfaces. Proceedings of the 4-TH Scientific and Technical Conference of CMEA. Moscow, 20 - 23 December 1976. Part 1. Processing of Liquid Radioactive Wastes of Low and Medium Activity.
1978, 137p CONF-761260-(Pt.1)
In Russian.Conference on processing and disposal of radioactive wastes and on decontamination of surfaces, Moscow, USSR, 20 Dec 1976.
U.S. Sales Only.

The results of research works done in the field of desactivation of liquid radioactive wastes of low and medium activity are described. Problems of desactivation of sewage from nuclear power plants and other nuclear installations are discussed. The results of efficiency estimation of different methods of sewage radioactivity lowering are discussed including such chemical methods of purification os coprecipitation and coagulation. Problems of application both the organic and the nonorganic sorbents for separation of radioactive substances from liquid wastes are discussed. Results of research on purification methods by electrodialysis and ion exchange are given. More that this, the results of experiments on evaporation of liquid radioactive wastes and problems of long time storage of highly concentrated liquid wastes are discussed. (Atomindex citation 11:518347)

NUREG/CR-0723 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Calculations of the Skyshine Gamma-Ray Dose Rates from Independent Spent Fuel Storage Installations (ISFSI) Under Worst Case Accident Conditions,
J. V. Pace, III, S. N. Cramer, and J. R. Knight. Sep 80, 34p ORNL/NUREG/TM-316
Contract W-7405-eng-26

Calculations of the skyshine gamma-ray dose rates from three spent fuel storage pools under worst case accident conditions have been made using the discrete ordinates code DOT-IV and the Monte Carlo code MORSE and have been compared to those of two previous methods. The DNA 37N-21G group cross-section library was utilized in the calculations, together with the Claiborne-Trubey gamma-ray dose factors taken from the library. Plots of all results are presented. It was found that the dose was a strong function of the iron thickness over the fuel assemblies, the initial angular distribution of the emitted radiation, and the photon source near the top of the assemblies.

PB81-109118 PC **A06**/MF **A01**
Brookhaven National Lab., Upton, NY.
Analysis and Evaluation of a Radioactive Waste Package Retrieved from the Atlantic 2800 Meter Disposal Site.
Technical note,
P. Colombo, R. M. Neilson, Jr., and M. W. Kendig. Sep 79, 119p BNL-51102, EPA-ORP/TAD-79-3

During the 1976 Atlantic 2800 meter radioactive waste disposal site survey, the first recovery of a radioactive waste package from a radioactive waste disposal site was performed by the EPA Office of Radiation Programs. The retrieved 80-gallon radioactive waste package was transported to Brookhaven National Laboratory where container corrosion and matrix leach rate and degradation studies were conducted.

18H. Radioactivity

AD-A089 187/9 PC **A05**/MF **A01**
Atmospheric Science Associates Bedford MA
SIMFIC: A Simple, Efficient Fallout Prediction Model.
Final rept. 16 Jan-31 Dec 79,
Hillyer G. Norment. 31 Dec 79, 81p DNA-5193F, AD-E300 912
Contract DNA001-76-C-0010

Details are given of the basis and mathematical structure of a fast, simple code, SIMFIC, for prediction of local fallout from surface and above surface

nuclear weapon explosions. Verification results are presented for five tests shot cases for which observed fallout patterns are available and which cover a yield range of 0.5 to 3380 KT. Prediction accuracy is as high as that obtained from the DELFIC code for these cases. Computing speed is on par with a code currently used for large-scale damage assessment studies. Other computing requirements are discussed briefly. (Author)

NUREG/CR-1334 PC **A05**/MF **A01**
Mathematical Applications Group, Inc., Elmsford, NY.
Validation of a Monte Carlo Code for Radiation Streaming Analyses.
Final rept. 1 Mar-1 Dec 79,
N. De Gangi, M. O. Cohen, E. Waluschka, and H. A. Steinberg. Sep 80, 90p MR-7068

Calculations have been performed with the SAM-CE computer code to demonstrate that an off-the-shelf Monte Carlo radiation transport code can, with affordable computer running times, adequately predict dose levels, due to streaming, in the vicinity of an operating nuclear power plant. The configuration of the Millstone II plant was simulated and neutron and secondary gamma ray cases were calculated on the operating floor, and elswhere, both with and without a water tank shield at the top of the cavity. Agreement between calculations and actual measurements was excellent; usually considerably better than a factor of two.

NUREG-0727-ADD PC **A04**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Operation of Joseph M. Farley Nuclear Plant, Units 1 and 2, Docket Nos. 50-348 and 50-364, Alabama Power Company.
Final environmental statement.
Sep 80, 54p
See also PB-208 888.

This addendum to the Final Environmental Statement addresses the environmental dose commitments and health effects from fuel cycle releases, fuel cycle socioeconomic impacts, and possible cumulative impacts pending further treatment by rulemaking.

18I. Reactor Engineering and Operation

AEEW-M-1725 PC **A02**/MF **A01**
UKAEA Atomic Energy Establishment, Winfrith (England).
Development and Validation of Thin Shell Models in Computer Codes for Fast Reactor Containment Analysis.
K. C. Kendall, and P. H. West. Oct 79, 16p
CONF-790802-80
International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.
U.S. Sales Only.

Increasing use is being made of computer codes to predict the dynamic response of a fast reactor containment following a hypothetical energy excursion. The validation work on those parts of the United Kingdom codes ASTARTE and SEURB-NUK concerning the prediction of deformation of the primary vessel and other thin shells, is reported. (Atomindex citation 11:511395)

BMFT-FB-K-79-12 PC **A03**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Irradiation of Test Rods in Standard Fuel Rods of the Nuclear Power Station at Obrigheim.
M. Gaertner. 1979, 39p
In German.
U.S. Sales Only.

In order to determine the in-pile length growth of fuel rods fabricated by use of Zry-4 cladding tubes, test rods were irradiated in Kernkraftwerk Obrigheim in fast neutron fluences (E>0.83 MeV) of up to 5.6 x 10 exp 21 cm exp -2 (three KWO operational periods). The irradiation experiment showed, that the in-pile length growth of the test rods and the test fuel rods is proportional to the fast neutron fluence (0t) to the power n, where n lies in the range 0.7 to 1.1. Fuel rods with UO sub 2 /Gd sub 2 O sub 3 (2.1 w% Gd sub 2 O sub 3) pellets were irradiated at linear heat ratings of 200 W/cm up to burnups of 30,000 MWd/t (U). The UO sub 2 /Gd sub 2 O sub 3 fuel rod performance was good and was comparable with that of KWO standard fuel rods in terms of dimensional and corrosion behaviour. (Atomindex citation 11:509029)

CEA-CONF-4502 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France).
Thermos Saclay Demonstration Project.
J. Aldebert, P. Nifenecker, and B. Lerouge. 1978, 19p CONF-781269-1
In French.French-Soviet colloquium on heat process reactors, Saclay, France, 7 Dec 1978.
U.S. Sales Only.

In the Thermos/Saclay project, the following are being examined in succession: heating facilities existing at present at the Centre, new facilities planned, changes to be made in the existing facilities, diagram for fitting the reactor into the existing system, operating and regulating conditions under consideration, impact on the environment and administrative procedures. (Atomindex citation 11:509022)

CEA-CONF-4615 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Services d'Electronique.
Applications of Optical Links to the Protective Instrumentation of Nuclear Power Stations and to Stabilisation of Scintillation Detectors.
G. Breuze. 1979, 6p CONF-7905158-1
In French.Electronic information meeting, Saclay, France, 15 May 1979.
U.S. Sales Only.

The description is given of a system of transmission by optical fibre opto-electronic links capable of carrying out many point by point transmissions of logical signals: between acquisition and protection processing units, between acquisition and protection processing units and the control room, between acquisition and protection processing units and logical safety units, and between logical safety units and control room. A short description is also given of an optical fibre signal transmission system constituting a new instrumentation for stabilising spectra coming from NaI (Tl) scintillation detectors. In addition to the remote control of the detectors such an instrumentation is capable of improving the stability performance of gamma ray cameras (a beam of monofibres is then necessary) as well as that of any detector placed in an inaccessible or hostile environment (fuel reprocessing plant, for example). (Atomindex citation 11:511464)

CEA-CONF-4616 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Technologie.
French Developments and Experience in the Field of Inservice Inspection.
R. Saglio, M. T. Destribats, M. Pigeon, M. Roule, and A. M. Touffait. 1979, 5p CONF-7905155-1
Conference on periodic inspection for pressurized components, London, UK, 8 May 1979.
U.S. Sales Only.

The French PWR nuclear plant program was at the origin of a large amount of R and D work in the field of inservice inspection. The actions which were undertaken may be split up into different levels: - the regulatory level, the R and D level, the design level, the flaw evaluation level. The first results of pre and inservice inspections are presented. The experience gained by French Atomic Energy Commission with new techniques like focussed ultrasonics transducers and multi frequency eddy current apparatus are discussed. (Atomindex citation 11:509046)

CEA-CONF-4703 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Technologie.
Instrumentation of Fuel Safety Test Rods of the PWR System in the Phebus Reactor.
R. Schley, J. P. Leveque, J. M. Aujollet, P. Dutraive, and J. Colome. 1979, 9p CONF-790646-10
In French.International colloquium on irradiation for reactor safety programmes, Petten, Netherlands, 25 Jun 1979.
U.S. Sales Only.

The tests were performed in an experimental cell centred in the core of the PHEBUS water reactor of 50 MW. The CEA make two types of apparatus for testing the safety of PWR fuel. One is for testing a single fuel stick and the other a bunch of 25 sticks. The instrumentation described enables the main parameters of the test to be known: temperatures of the fuel - central temperature of the UO sub 2 - cladding surface temperatures; temperature of the cooling circuits - thermal balance - temperatures of the structures, etc.; coolant pressure; internal pressure of the fuel sticks; direction and flow rate of the fluid. This instrumentation and the technological problems to be overcome are described and the results of the first tests carried out are given. (Atomindex citation 11:522914)

IAEA-R-1562-F PC **A06**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Study of the Light and Heavy Water Leaks in Nuclear Reactors and Development of Techniques for Their Detection, Location and Estimation. Final Report for the Period 1 December 1974-30 November 1977.
S. Bashiruddin Mahmood. Jan 79, 116p
U.S. Sales Only.

In heavy water type nuclear reactors the detection and control of heavy water and light water escapes from different systems is of vital importance in the successful and economic operation of these type of plants. The high cost of heavy water makes it imperative to minimise all such escapes, in order to reduce the loss as well as the upgrading cost of downgraded collection recovered from the reactor building. Original methods and devices have been developed at the Karachi Nuclear Power Plant which successfully solve this problem. This report describes the constructional and operational features of these devices. (Atomindex citation 11:509060)

INIS-mf-5578 PC **A02**/MF **A01**
Hochtemperatur-Kernkraftwerk G.m.b.H., Uentrop (Germany, F.R.).
1978 Business Report.
1979, 23p
In German.
U.S. Sales Only.

I. Agenda of the regular meeting of the society on August 12, 1979, II Report of the management 1. General, 2. Agreements and partnership, 3. Staff, 4. Costs and financing, 5. Progress in building and situation of schedules, 6. Licensing procedure, 7. Closing of the fuel cycle, 8. Explanations for annual account for 1978. III Balance for the 31st of December, 1978, Profit- and loss-account for the period between the 1st of January and the 31st of December, 1978, IV Accountant's certificate. (Atomindex citation 11:518145)

INIS-mf-5588 PC **A02**/MF **A01**
Kernkraftwerk Lingen G.m.b.H., Darme/Lingen (Germany, F.R.).
Business Report on the 14TH Financial Year from January 1 to December 31, 1977.
Mar 78, 16p
In German.
U.S. Sales Only.

Within this annual report, the director's report deals with technical and economic aspects and with personnel problems. The annual settlement statement is explained, and economic balance is given for December 31, 1977, and the profit-loss calculation is given. (Atomindex citation 11:518097)

INIS-mf-5590 PC **A06**/MF **A01**
Bundesministerium des Innern, Bonn (Germany, F.R.). Referat Oeffentlichkeitsarbeit.
Harrisburg Report. Evaluation of the Accident at Harrisburg Nuclear Power Plant. 2nd Interim Report of the Committee on Internal Affairs of the German Federal Parliament.
1 Jun 79, 110p
In German.

U.S. Sales Only.

Interim report on the Harrisburg accident, containing all information received by the Federal Minister of the Interior until May 10, 1979. Subjects: 1) Description of the Harrisburg accident; 2) safety check on German nuclear power plants on the basis of the accident analysis; 3) the Harrisburg accident in view of risk assessments and society; 4) consequences of Harrisburg. (Atomindex citation 11:518121)

INKA-Conf-79-446-001
PC **A02**/MF **A01**
Kraftwerk Union A.G., Erlangen (Germany, F.R.).
Uses and State of Development of the LWR.
W. P. Henschel. 1979, 11p
In German.
U.S. Sales Only.

The paper discusses the uses and state of development of LWR reactors in West Germany. Other subjects are the possibilities of coal gasification on the basis of nuclear process steam and the use of the PWR reactor as high converter. (Atomindex citation 11:518091)

JAERI-M-7835 PC **A06**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Analysis of LOCA Experiments with RELAP4J Code. Analysis of ROSA-II Experiments for Cold Leg Break Runs 413 and 312.
Y. Mochizuki, M. Sobajima, and M. Suzuki. Sep 78, 110p
In Japanese.
U.S. Sales Only.

The results of analysis with RELAP4J Code are presented for two typical experiments of cold leg break (Runs 413 and 312), in the ROSA-II (Rig of Safety Assessment II) test program. The objectives of analysis are to evaluate validity of the RELAP4J Code, to improve analytical models and to get a better understanding of experimental phenomena. The two tests were performed under actual reactor initial pressure and temperature, in the respective different LPCI locations. Typical factors influencing the pressure history were examined analytically. In conclusion, the predictions of macroscopic-hydraulic phenomena such as pressure transient in each location are good, and the predictions of microscopic-hydraulic phenomena such as steam-water slip velocity, multi-dimentional flow in plenums or core, quenching velocity, cooling of fuel rods by small coolant flow are not good. Experimental phenomena not clarified yet with test data are predicted with the analysis. (Atomindex citation 11:509041)

JAERI-M-8161 PC **A15**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Data Report on Series 6 Reflood Experiment. Constant Flooding Rate Experiment Data.
T. Iguchi, Y. Murao, T. Sudoh, Y. Sudo, and J. Sugimoto. Mar 79, 329p
In Japanese.
U.S. Sales Only.

Series 6 reflood experiments (experiment with 4 x 4 indirectly heated rods) were carried out from March to June 1978. The purpose of the experiments was: 1) to observe overall reflood phenomena in a 4 x 4 indirectly heated heater rod bundle with thermocouples inbedded completely in the cladding, 2) to examine the quench characteristics at low flooding rate, 3) to measure steady-state differential pressures in the core, 4) to investigate the heat transfer coefficients before quenching, 5) to investigate the water effluence behavior at outlet of the core, 6) to investigate the effect of a non-heated rod, and 7) to examine the response characteristics of the system at forced osciliating flooding rate. Described are the experimental conditions and the results (cladding temperatures, pressure differences and flow rates) in the constant flooding rate experiments in series 6 experiment. (Atomindex citation 11:509032)

JAERI-M-8162 PC **A13**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Data Report on Reflood Experiment, 7. Series 6, Intermittent Flow Rate Core Forced Injection Tests and System Effect Tests.
T. Sudoh, Y. Murao, T. Iguchi, Y. Sudo, and J. Sugimoto. Mar 79, 283p
In Japanese.
U.S. Sales Only.

To develop an analysis code, the purpose of the series 6 reflood experiment was as follows: 1) Overall reflood phenomena in a 4 x 4 array indirectly heated heater rod bundle. Sheathed thermocouples were completely embedded in the heater rod cladding. 2) Quench characteristics at low flooding rate. 3) Differential pressure response in the core. 4) Heat transfer coefficients downstream of the quench point. 5) Water effluence behavior at outlet of the core. 6) Effect of non-heated rod in the core. 7) System response under intermittent-flow-rate core forced injection. The tests were in three groups, according to the water injection methods to the core: 1) constant-flow-rate core forced injection, 2) intermittent-flow-rate core forced injection, and 3) system effect test. By the tests, effects were studied of the core power, initial rod temperature, system pressure, inlet water subcooling, flooding rate and un-heated rod. This report presents the results of intermittent-flow-rate core forced injection tests and system effect tests. (Atomindex citation 11:509047)

NUREG/CR-0169 PC **A03**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
LOFT Experimental Measurements Uncertainty Analyses. Volume XVIII. Radiation-Hardened Gamma Densitometer,
Gordon D. Lassahn. Oct 80, 40p EGG-2037
Contract DE-AC07-76IDO1570

The measurement uncertainty for the LOFT radiation-hardened gamma densitometer installed in the Loss-of-Fluid Test (LOFT) system is analyzed. These densitometers measure the fluid density in the LOFT primary coolant piping during the loss-of-coolant experiments. This measurement uncertainty analysis concluded that the random noise associated with the radiation process randomness and the bias uncertainty associated with the shim calibration procedure are the major sources of uncertainty in measurements made by the LOFT densitometers. The uncertainty ranges from 0.05 to 0.51 Mg/cubic meters, depending on experiment parameters.

NUREG/CR-1515 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Flashing Inception in Flowing Liquids,
Owen C. Jones, Jr. Oct 80, 33p BNL-NUREG-51221
Contract DE-AC02-76CH00016

The inception of net vaporization in flashing flows is examined. It is suggested that the flashing inception can be expressed as two additive effects. One is due to the static decompression which is a function of the initial temperature and also of the expansion rate. The other effect which is a function of Reynolds number and flashing index, is due to the turbulent fluctuations of the flowing liquid. It is shown that by taking a three standard deviation band on the turbulent velocity fluctuations, an adequate representation of the inverse mass flux effect on flashing inception for existing data is obtained. The turbulence effects are combined with the correlation of Alamgir and Liehard to provide predictive methods recommended for the case where both static and convective decompression effects exist.

NUREG/CR-1540 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Lumped-Parameter Models for Transient Conduction in Nuclear Reactor Components,
Wolfgang Wulff. Oct 80, 45p BNL-NUREG-51231
Contract DE-AC02-76CH00016

Lumped-parameter models are presented for the prediction of transient conduction in cylinders, plane-parallel slabs, tubes and fuel elements under conditions of small-break loss of coolant accidents and planned transients in nuclear reactor systems. The models consists of ordinary differential equations, one each for the solid cylinder, the slab and the tube, and two for fuel pellet and clad in the fuel element. The differential equation are derived from the partial differential equation to energy conservation by volume averaging. The models can be applied to each axial node of a flow passage. The formulation is particularly suitable for explicit integration over time with high-order integration schemes for ordinary, first-order differential equations.

NUREG/CR-1561 PC **A14**/MF **A01**
Sandia National Labs., Albuquerque, NM.
The Behavior of Hydrogen during Accidents in Light Water Reactors,
Martin P. Sherman, Marshall Berman, John C. Cummings, George W. Perkins, and Dana A. Powers Oct 80, 303p SAND-80-1495
Prepared in cooperation with Energy, Inc., Albuquerque, NM.

A compendium of information concerning the possible behavior of hydrogen during hypothetical accidents in light water reactors has been compiled. The report addresses the questions of hydrogen generation, solubility, detection, combustion and recombiners. The report is intended for use of reactor operator training and as a reference during emergencies as well as for individuals interested in the general state of knowledge concerning the behavior of hydrogen in LWR accidents. The hydrogen sources considered include the metal-steam reaction, radiolysis, corrosion of paints and galvanized material and the interaction of core materials with concrete. Conditions which may lead to hydrogen combustion and containment damage are also discussed.

NUREG/CR-1575 PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Hydrogen Mixing in a Closed Containment Compartment Based on a One-Dimensional Model with Convective Effects.
Informal rept.,
G. J. E. Willcutt, Jr, R. G. Gido, and A. Koestel. Sep 80, 32p LA-8429-MS

A transient, 1 dimensional finite difference model was developed for determining the hydrogen concentration variation with position in a closed containment compartment caused by radiolysis following a LOCA. The model includes mixing due to molecular and eddy diffusion and natural convection. For representative compartments, the maximum hydrogen concentration difference between the bottom and top of the compartment never exceeds 0.25 volume percent when all 3 mixing mechanisms are considered for a range of parameters.

NUREG/CR-1610-V-1-1 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Inspection Methods for Physical Protection Project: Quarterly Report, March-May, 1980,
D. D. Bowden, R. T. Bradley, A. W. Olson, F. Rogue, and J. W. Savage. Sep 80, 23p UCID-18123-80-1
See also NUREG-CR-1258-V-2.

This is the fifth quarterly report to the U.S. Nuclear Regulatory Commission (NRC) on the progress at Lawrence Livermore National Laboratory (LLNL) in the Inspection Methods for Physical Protection (IMPP) project. Besides reporting on trips for field tests and tests and data acquisition, the feasibility studies for field evaluation of procedures, and the progress of the E-field intrusion detector training film, the report details the production status of the 23 procedures in the draft module 81100 replacement series already delivered to NRC and the status of 28 procedures now being written for transportation of irradiated fuel and for possession and use of formula quantities of strategic special nuclear materials (SSNM).

NUREG/CR-1632 PC **A06**/MF **A01**
California Univ., Los Angeles. School of Engineering and Applied Science.
Hydrodynamics of a Vapor Jet in Subcooled Liquid,
I. Catton, C. K. Chan, V. K. Dhir, and M. Simpson. Sep 80, 109p

This report addresses the two phase flow of a steam jet, injected vertically downward from a submerged pipe into a stagnant pool of subcooled water. Direct contact heat and mass exchange rates and hydrodynamic pressure pulsations are investigated. The emphasis of the present work pertains to dynamics of the subsonic (unchoked) regime of the exit steam injection rate. Experimental results indicate a large influence by the pool subcooling and jet diameter on the frequency and

amplitude measurements of steam jet pulsations. In contrast, the exit steam velocity has a minor effect on the jet pulsation characteristics. A numerical model for steam jet pulsations is proposed, based on the experimental observation. Reasonable agreement between numerical and experimental results has been achieved.

NUREG/CR-1635 PC **A99**/MF **A01**
Southwest Research Inst., San Antonio, TX.
Nuclear Plant Reliability Data System 1979 Annual Reports of Cumulative System and Component Reliability.
1979, 630p
Sponsored in part by Edison Electric Inst., New York, Tennessee Valley Authority, Chattanooga, and American Public Power Association.

The primary purposes of the information in these reports are the following: to provide operating statistics of safety-related systems within a unit which may be used to compare and evaluate reliability performance and to provide failure mode and failure rate statistics on components which may be used in failure mode effects analysis, fault hazard analysis, probabilistic reliability analysis, and so forth.

NUREG/CR-1640 PC **A04**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Experiment Data Report for Semiscale Mod-3 Small Break Test Series (Tests S-SB-P1, S-SB-P2, and S-SB-P7),
Leonard L. Weidert, and L. Bruce Clegg. Oct 80, 67p EGG-2053
Contract DE-AC07-76IDO1570

Test data from the Semiscale Mod-3 system at Idaho National Engineering Laboratories are presented for Tests S-SB-P2, and S-SB-P7. These tests are three of the Semiscale Mod-3 Small Break Test Series, which is conducted to investigate the thermal-hydraulic phenomena resulting from a small break loss-of-coolant accident (LOCA) in a pressurized water reactor (PWR) system, and to provide experimental data for assessing the analytical capability of computer codes used in LOCA analysis. The primary objectives are to provide comparative data for a small break LOCA in which the main coolant pumps are secured at approximately 12.6 kPa (S-SB-P1), 4.2 kPa, (S-SB-P2), and 3.4 kPA (S-SB-P7). Of particular interest is the influence of pump operation on fluid conditions near the break location, and resulting influence on break flow, system depressurization, and system mass inventory.

NUREG/CR-1647 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Advanced Two-Phase Flow Instrumentation Program Quarterly Progress Report for January-March 1980,
K. G. Turnage, R. L. Anderson, C. E. Davis, and G. N. Miller. Sep 80, 27p ORNL/NUREG/TM-403
Contract W-7405-eng-26
See also report for Jul-Sep 79, NUREG/CR-1212.

Work performed to develop reliable liquid level sensors for in-vessel use in pressurized water reactors is described. During this period, and improved heated thermocouple level sensor was fabricated and techniques for separating thermocouple output signals from superimposed ac voltages were developed. Experiments that were performed with a thermal-type level sensor in natural convection to saturated water and steam are described. Pressures in those tests ranged from 0.1 to 10 MPa (15 to 1500 psia). Acoustic techniques using pulse transit times along a waveguide were studied. A single waveguide was used to obtain accurate measurements of liquid level at room temperature and to compensate for temperature variations over a 10C temperature and to compensate for temperature variations over a 10C temperature range.

NUREG/CR-1661 PC **A04**/MF **A01**
Lawrence Livermore National Lab., CA.
Variability of Dynamic Characteristics of Nuclear Power Plant Structures. Seismic Safety Margins Research Program (SSMRP).
Technical rept.,
D. A. Wesley, P. S. Hashimoto, and R. B. Narver. Sep 80, 75p UCRL-15267

This report presents the results of an investigation of the sources of random variability of the dynamic response of nuclear power plant structures. Sources affecting both the frequencies and dynamic amplification of structures are identified. Numerical values developed for the Zion auxiliary building are presented for sources of inherent randomness. Several sources of uncertainty resulting from lack of knowledge of material properties or approximations in analytical modelling are discussed but are not in general quantified. The dispersion in both the structure dynamic characteristics and the input to equipment as defined by the in-structure response spectra is addressed. The evaluation of the dynamic response variability is limited to elastic response levels.

NUREG/CR-1665 PC **A08**/MF **A01**
Lawrence Livermore National Lab., CA.
Equipment Response at the El Centro Steam Plant During the October 15, 1979 Imperial Valley Earthquake.
Technical rept.,
R. C. Murray, T. A. Nelson, R. D. Campbell, J. A. Young, and H. A. Levin. Oct 80, 165p UCRL-53005

For the U.S. Nuclear Regulatory Commission (NRC), Lawrence Livermore National Laboratory (LLNL) performed a dynamic seismic analysis of Unit 4 of the El Centro Steam Plant in El Centro, Calif. Built in 1968, Unit 4 is an oil-or-gas-fired, steam-driven turbine-generator that was designed to resist a static lateral force equivalent to 20% of the dead and live load applied laterally. However, the unit's structural and mechanical systems sustained only minor damage during the October 15, 1979 Imperial Valley earthquake that produced an estimated 0.5 g peak horizontal ground acceleration (0.6 g vertical) at the site. LLNL's seismic analysis was done to analytically estimate the equipment response, which, when compared to actual observation, will indicate the levels of actual equipment capacity.

NUREG-0103-REV-4 PC **A19**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Standard Technical Specifications for Babcock and Wilcox Pressurized Water Reactors. Revision 4.
Technical rept.,
Martin J. Virgilio. Oct 80, 440p
See also Revision 3, NUREG-0103-REV-3.

The Standard Technical Specifications for Babcock and Wilcox Pressurized Water Reactors (B&W-STS) is a generic document prepared by the U.S. NRC for use in the licensing process. The B&W-STS provide applicants with model specifications to be used in formulation plant-specific technical specifications required by 10 CFR Part 50, Section 50.36, which set forth the specific characteristics of the facility and the conditions for its operation that are required to provide adequate protection to the health and safety of the public. This document is revised periodically to reflect current licensing requirements.

NUREG-0691 PC **A11**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
Investigation and Evaluation of Cracking Incidents in Piping in Pressurized Water Reactors.
Technical rept.
Sep 80, 246p

This report summarizes an investigation of known cracking incidents in pressurized water reactor plants. Several instances of cracking in feedwater piping in 1979, together with reported cases of stress corrosion cracking at Three Mile Island Unit 1, led to the establishment of the third Pipe Crack Study Group. Major differences between the scope of the third PCSG and the previous two are: (1) the emphasis given to systems safety implications of cracking, and (2) the consideration given all cracking mechanisms known to affect PWR piping, including the failure of small lines in secondary safety systems. The present PCSG reviewed existing information on cracking of PWR pipe systems, either contained in written records of collected from meetings in the United States, and made recommendations in response to the PCSG charter questions and to othe major items that may be considered to either reduce the potential for cracking or to improve licensing bases.

NUREG-0721 PC **A05**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Safeguards.
Acceptance Criteria for the Physical Protection Upgrade Rule Requirements for Fixed Sites.
Information guide,
P. Dwyer. Sep 80, 86p

This document has been developed as a tool to assist in providing consistent evaluation of upgraded physical security plans submitted in response to the Physical Protection Upgrade Rule, effective March 25, 1980. It presents a means for assuring licensee compliance with every regulatory requirement of particular significance to the protection of the public health and safety. Acceptance criteria are included to determine the extent to which each licensee meets the regulatory requirements. The format parallels Regulatory Guide 5.52, Standard Format and Content of a Licensee Physical Protection Plan for Strategic Special Nuclear Material at Fixed Sites (Other Than Nuclear Power Plants).

ORNL/TM-7418 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Determination of Coefficients for the Universal Laws of Friction and Heat Transfer for CFTL Calculations.
S. A. Hodge. Aug 80, 28p
Contract W-7405-ENG-26

The friction factor and Stanton number for flow past a roughened surface are determined by the parameters A and R(h exp +) of the universal law of friction and A/sub H/ and G(h exp +) of the universal law of heat transfer. The methods to be used for determination of these parameters for the particular roughness to be used in the Core Flow Test Loop (CFTL) are presented. Examples are given concerning the application of these methods to both transitional and fully rough flow using experimental results taken from the literature. (ERA citation 05:034921)

RISO-M-2186 PC **A03**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Interpretation of Strain Measurements on Nuclear Pressure Vessels.
S. I. Andersen, and P. Engbaek. Nov 79, 28p
U.S. Sales Only.

Selected results from strain measurements on 4 nuclear pressure vessels are presented and discussed. The measurements were made in several different regions of the vessels: transition zones in vessel heads, flanges and bottom parts, nozzles, internal vessel structure and flange bolts. The results presented are based on data obtained by approximately 700 strain-gauges and a comprehensive knowledge of the quality obtained by such measurements is established. It is shown that a thorough control procedure before and after the test as well as detailed knowledge of the behaviour of the signal from the individual gauges during the test is necessary. If this is omitted, it can be extremely difficult to distinguish between the real structural behaviour and a malfunctioning of a specific gauge installation. In general, most of the measuring results exhibit a very linear behaviour with a negligible zeroshift. However, deviations from linear behaviour are observed in several cases. This nonlinearity can be explained by friction (flange connections) or by gaps (concentrical nozzles) in certain regions, whereas local plastic deformations during the first pressure loadings of the vessel seem to be the reason in other regions. (Atomindex citation 11:511347)

RISO-M-2211 PC **A05**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Evaluation of LWR Fuel Performance under Transient and off-Normal Conditions. A Review of Recent Reports.
P. Knudsen. Nov 79, 83p
U.S. Sales Only.

Reports from the meetings at Petten (Nov. - Dec. 1978), Portland (April-May 1979) and Arles (May 1979) have been reviewed together with various reports related to the Three-Mile Island accident. The reports were selected to cover transients in normal operation (power ramps, load-following) as well as off-normal transients. (Atomindex citation 11:511350)

STUDSVIK/E4-79/11 PC **A03**/MF **A01**
Studsvik Energiteknik AB, Nykoeping (Sweden).
Post-Test Examination of 64-Rod Bundle No 2 Used in the GOETA-LOOP Reflooding Experiment.
L. Nilsson, and L. Gustafson. Feb 79, 46p
U.S. Sales Only.

The 64-rod bundle that was utilized in the reflooding experiment was the second full scale BWR test bundle installed in the StudsvikGOETA-loop for ECCS tests. At the end of the test series there were indications of distortions in the bundle geometry similar to those of test section No 1. In order to investigate these distortions, to facilitate further analysis of test data, the test section was dismantled and examined, the result of which is described in this report. The examination revealed severe distortions of the bundle geometry in the shape of bends in the rods, expecially at the midplane level which experienced the highest temperatures during the tests. Such distortions seem to be hard to avoid in test bundles when used in repeated tests at high temperatures. Present results indicate that the rod bowing started already for tests in the 1000 - 1100 degC region. As a general conclusion can be drawn, however, that the rod bowing did not harm the ECCS coolability of the bundle. On the contrary both average and peak cladding temperatus decreased with the number of runs, mostly due to the continuous increase of the surface emissivity. (Atomindex citation 11:511351)

18J. Reactor Materials

AECL-5976 PC **A11**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Dynamics of Nuclear Fuel Assemblies in Vertical Flow Channels: Computer Modelling and Associated Studies.
V. A. Mason, M. J. Pettigrew, G. Lelli, L. Kates, and E. Reimer. Oct 78, 237p
U.S. Sales Only.

A computer model, designed to predict the dynamic behaviour of nuclear fuel assemblies in axial flow, is described in this report. The numerical methods used to construct and solve the matrix equations of motion in the model are discussed together with an outline of the method used to interpret the fuel assembly stability data. The mathematics developed for forced response calculations are described in detail. Certain structural and hydrodynamic modelling parameters must be determined by experiment. These parameters are identified and the methods used for their evaluation are briefly described. Examples of typical applications of the dynamic model are presented towards the end of the report. (Atomindex citation 11:511329)

AECL-6411 PC **A03**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Grain Growth in UO sub 2 . Studies at Chalk River Nuclear Laboratories.
I. J. Hastings, J. A. Scoberg, K. MacKenzie, and W. Walden. Jun 79, 34p
U.S. Sales Only.

Grain growth studies have been carried out on UO sub 2 to provide data for the fuel modelling program and to evaluate fuel fabricated in commissioning the Mixed Oxide Fuel Fabrication Laboratory at Chalk River Nuclear Laboratories. Fuel examined includes natural UO sub 2 commercially fabricated from ADU powder for CANDU reactors; natural UO sub 2 commercially fabricated from AU powder; natural UO sub 2 from ADU and AU powder, fabricated in the MOFFL; and commercially fabricated UO sub 2 enriched 1.7, 4.5, and 9.6 wt % U-235 in U. Samples were step-annealed in vacuo at 1870 to 2070 exp 0 K for up to 32.5 h. All data fit a (grain size)/sup 2.5/ vs annealing time relationship. Apparent activation energy for grain growth, Q, depends on fuel type and varies from 150 +- 10 kJ/mol for early AU powder to 360 +- 10 kJ/mol for pellets from ADU fabricated in the MOFFL. Grain sizes calculated using the laboratory equation in a fuel performance code tend to be greater than those measured in irradiated natural fuel, suggesting irradiation-induced inhibition of grain growth. However, any inhibition is equivalent to that expected for a systematic 5% underprediction in reactor power. (Atomindex citation 11:521327)

AECL-6412 PC **A02**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
NIRVANA, A High-Temperature Creep Model for Zircaloy Fuel Sheathing.
H. E. Sills, and R. A. Holt. May 79, 24p
U.S. Sales Only.

We have developed a multi-component model to describe the transient plastic deformation of Zircaloy fuel sheathing during high-temperature transients. From deformation maps we identify three deformation mechanisms which, in principle, occur in all three phase fields of Zircaloy (alpha , alpha + beta , beta): diffusional creep, dislocation creep, and athermal strian. A strain component occurring during the alpha implies beta transformation is also identified. Microstructural changes which alter deformation rates - grain structure, recrystallization, phase transformation - are accounted for. The individual components of the model represent known metallurgical phenomena. The combined model gives excellent agreement with transient test data from 700 to 1800 exp 0 K, a range of heating rates from 0 to 100 exp 0 K.s exp -1 , and a range of strain rates from 10 exp -5 to 10 exp -1 .s exp -1 . To enable comparison with available data the transient creep model was combined with an axially uniform, thin-walled tube representation having anisotropic material properties. The resulting computer code, NIRVANA provides facilities for simulating uniaxial and biaxial tube tests over specified stress/temperature histories. (Atomindex citation 11:521417)

CEA-CONF-4501 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Cadarache, Saint-Paul-les-Durance (France). Dept. des Reacteurs a Eau.
Description of Thermos Reactor Core.
G. Dupuy, J. Peltier, J. P. Schwartz, and J. B. Thomas. 1978, 9p CONF-781269-2
In French.French-Soviet colloquium on heat process reactors, Saclay, France, 7 Dec 1978.
U.S. Sales Only.

A description is given of the 100 MWth Thermos reactor core (fuel, assembly, plates, casings, control rods) and its neutron thermohydraulic operation (steady state, transient state, fast stopping of a pump, primary circuit depressurization). (Atomindex citation 11:509027)

CEA-CONF-4726 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Cadarache, Saint-Paul-les-Durance (France). Dept. de Developpement des Elements Combustibles.
Reliability of Fuel Elements in Operation and Failure Probability Estimation.
J. Truffert. 1979, 8p CONF-790802-82
In French.International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.
U.S. Sales Only.

The Weibull statistical failure model is used to describe the in-pile reliability. The driving parameter is a mechanical damage function which merges strains and the mechanical property of the can under irradiation. The fitting is based on: some attribute of this damage function and the good behaviour of a large number of Fortissimo driver fuel pins. Assuming the same kind of failure, the extrapolation, in the near future, allows to estimate the rupture rate rise. For example a peak burn-up increase from 8.2 to 11 at% leads to expect a doubling of the end of life failure probability. (Atomindex citation 11:522778)

CEA-CONF-4728 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Cadarache, Saint-Paul-les-Durance (France). Dept. de Developpement des Elements Combustibles.
Verdon: Code of Mechanical and Thermal Behavior of Fuel Element.
C. Courtois, and J. Truffert. 1979, 9p CONF-790802-81
In French.International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.
U.S. Sales Only.

Verdon code must be used for analysis and simulation of mechanical, two-dimensional, thermal and physico-chemical behavior of fuel oxide pin in steady-state and transient conditions. Calculation can be done in plane or axisymmetric geometry. Radial, one dimensional, thermal analysis works with finite differences. It takes into account the fissile material's evolution (radial redistribution, flux deepening ...) and the main fuel physico-chemical properties (conductivity, migration, fission gas release ...). Only thermal consequences of fuel mechanical behavior: fuel-cladding gap width, crack formation, creep ... are submitted to a two dimensional analysis. Mechanical analysis works in two dimensional, finite elements, plane or axisymmetric geometry. The mesh represents a part of fuel and cladding pin. (Atomindex citation 11:522768)

IKE-6-124 PC **A09**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme.
Optimum Fuel Use in PWR Reactors.
W. Neubauer. Jul 79, 192p
In German.Thesis.
U.S. Sales Only.

An optimization program was developed to calculate minimum-cost refuelling schedules for PWR reactors. Optimization was made over several cycles, without any constraints (equilibrium cycle). In developing the optimization program, special consideration was given to an individual treatment of every fuel element and to a sufficiently accurate calculation of all the data required for safe reactor operation. The results of the optimization program were compared with experimental values obtained at Obrigheim nuclear power plant. (Atomindex citation 11:509044)

INIS-mf-5568 PC **A12**/MF **A01**
Sovet Ekonomicheskoi Vzaimopomoshchi, Moscow (USSR). Postoyanniya Komissiya po Ispol'zovaniyu Atomnoi Energii v Mirnykh Tselyakh.
Investigations in the Field of Spent Fuel Reprocessing. Vol. 3.
1975, 262p CONF-7404140-(V.3)
CMEA symposium on investigations in the field of spent fuel reprocessing, Marianske Lazne, Czechoslovakia, 24 Apr 1974.
U.S. Sales Only.

Individual papers were abstracted and indexed. (Atomindex citation 11:512273)

JAERI-M-8107 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Contact Pressure Between Pellets and Cladding Tube in Axi-Symmetric Two-Dimensional Problems.
Y. Harayama, F. Izumi, R. Yamada, and T. Nakajima. Mar 79, 30p
In Japanese.
U.S. Sales Only.

The contact pressure between fuel pellets and cladding tube is necessary for estimation of the stress acting onto the tube and the gap heat transfer. Recently these estimations are made by use of computer programs. The contact pressures analyticaly obtained are usable in checking those obtained numerically by programs. The contact pressures in axi-symmetric two-dimensional problems applied to fuel rod were obtained and formulized. The contact pressures under plane strain, plane stress and Lame's conditions can be plotted on the figure which is drawn by applying axial slip to Lame's conditions. (Atomindex citation 11:508952)

JAERI-M-8187 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Evaluation on Oxidation of Zry-4 Cladding During Rapid Transient in NSRR Experiments.
S. Shiozawa, S. Yanagihara, and S. Saito. Mar 79, 30p
In Japanese.
U.S. Sales Only.

Oxide layer thickness at the external surface of Zircaloy cladding was measured metallurgically at the

position of a thermocouple for the fuel rods irradiated to different energy depositions in NSRR experiments. The oxide layer thickness was related principally with the maximum cladding surface temperature, and it was approximately 4 mu m and 30 mu m in the claddings attained 1300 exp 0 C and 1600 exp 0 C at maximum, respectively. On the other hand, oxide layer thickness was calculated on the basis of the temperature histories measured with thermocouples. Kawasaki et al.'s out-of-pile experimental equation was used for the temperature range below 1577 exp 0 C and Klepfer's for the temperature range above 1577 exp 0 C. Results showed that 90% of the total oxide layer forms during the period when the cladding surface temperature is around its maximum, not much less than 100 exp 0 C. The measured oxide layer thickness agrees well with the calculated value for the temperatures below 1400 exp 0 C, but for the temperatures above 1400 exp 0 C the measured value is much larger than the calculated. This discrepancy is possibly due to the large temperature difference between cladding surface and cladding interior because of the increase of ZrO sub 2 layer with extremely low thermal conductivity and also to the lower temperature indication of the thermocouple because of the eutectic reaction between zirconium and thermocouple platinum. (Atomindex citation 11:509014)

JAERI-M-8259 PC **A06**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Semiannual Progress Report on the NSRR Experiments, (7). July to December 1978.
May 79, 106p
In Japanese.
U.S. Sales Only.

Fuel behavior studies with simulated reactivity-initiated accident (RIA) conditions have been performed using Nuclear Safety Research Reactor (NSRR) since October 1975. This report describes the results obtained from July to December 1978. A total of 48 tests were carried out during the period; which are 9 standard fuel rod tests (pellet elongation measurements and rod supporting effect tests), 16 fuel design parameter tests (pre-pressurized rod tests and cladding heat treatment effect tests), 13 cooling environment parameter tests (subcooling effect tests, forced flow tests and clustered-rod tests), 4 waterlogged rod tests, and 6 miscellaneous tests. (Atomindex citation 11:509001)

KFK-2894 PC **A04**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Spaltstoffflusskontrolle.
Development of a Safeguards Concept for Separation Nozzle Plants. Final Report of the 1976 Project Definition Phase.
W. Bahm, D. Gupta, H. J. Didier, and P. Schwegmann. Nov 79, 55p
In German.
U.S. Sales Only.

By this report the first concept for safeguarding of the flow of nuclear material and the inventory of nuclear material in a uranium enrichment plant working according to the separation nozzle process, is introduced. The first concept presented forms the final stage of a project definiton phase in which the specific requirements, questions and problems resulting from the necessity of safeguarding of nuclear material, have been worked out. First calculations on the basis of the concept developed, have shown under simplifying assumptions, that the range of deviation for the establishment of the inventory of nuclear material is too high related to the limit value which is at present given by the safeguards authorities. This control of nuclear material, however, can be precised by measures which will be worked out in a second work phase in a concentrated form. (Atomindex citation 11:511532)

NUREG/CR-1192 PC **A14**/MF **A01**
Lawrence Livermore National Lab., CA.
Material Accounting as Required by the United States Nuclear Regulatory Commission: Capabilities and Vulnerabilities,
Judy J. Lim, and John G. Heubel. Sep 80, 325p
UCRL-52734

The Lawrence Livermore National Laboratory has undertaken to assist the U.S. Nuclear Regulatory Commission in upgrading its material accounting (MA) regulations. As part of this effort, this report evaluates and critiques the current status of material accounting as required by Parts 70.51 through 70.59 of the Code of Federal Regulations. Through the development and assessment of a generic, minimal MA system, the capabilities of the MA system have been delineated, and the vulnerabilities of the MA system to deliberately induce system failures (i.e., tampering) have been determined.

NUREG/CR-1576 PC **A07**/MF **A01**
Naval Research Lab., Washington, DC.
A Review of Fatigue Crack Growth of Pressure Vessel and Piping Steels in High-Temperature, Pressurized Reactor-Grade Water.
Interim rept.,
W. H. Cullen, and Kari Torronen. 19 Sep 80, 130p NRL-MR-4298

Fatigue crack growth data sets, for pressure vessel and piping steels, in reactor-grade water environment have appeared in various reports and publications since about 1972. All of the results which have been published from 1972 through 1979 have been plotted and are presented in this report. Beginning with a discussion of the need for these data, and an explanation of the laboratory facilities which are required for this research, this report goes on to describe the overall trends which have envolved through consideration of the data sets and the conditions under which they were generated. A model for hydrogen assisted fatigue crack growth is described and applied to the pressurized water reactor type of environment. A complete listing of references is included in the report.

NUREG/CR-1590 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Evaluation Methodology for Fixed-Site Physical Protection Systems.
Conference paper,
H. A. Bennett, and M. T. Olascoaga. Sep 80, 23p SAND-80-0505
Presented at the Annual INMM Conference (21st), West Palm Beach, Florida, June 30-July 2, 1980.

A system performance evaluation methodology has been developed to aid the Nuclear Regulatory Commission (NRC) in the implementation of new regulations designed to upgrade the physical protection of nuclear fuel cycle facilities. The evaluation methodology, called Safeguards Upgrade Rule Evaluation (SURE), provides a means of explicitly incorporating measures for highly important and often difficult to quantify performance factors, e.g., installation, maintenance, training and proficiency levels, compatibility of components in subsystems, etc. This is achieved by aggregating responses to component and system questionnaires through several successive levels of a functional hierarchy developed for each primary performance capability specified in the regulations, 10 CFR 73.45. An overall measure of performance for each capability is the result of this aggregation process. This paper provides a description of SURE.

RISO-M-2183 PC **A03**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Isotope Analysis. Radiochemical Burn-Up Determination.
N. Rhod Larsen, and E. Larsen. Sep 79, 32p
U.S. Sales Only.

The radiochemical analysis of heavy isotopes (uranium, plutonium, americium, and curium isotopes) and burn-up (Nd148 method) in samples of irradiated nuclear fuels is described. The analysis is based on isotope dilution technique in combination with mass spectrometry and alpha sepctrometry. (Atomindex citation 11:508958)

18K. Reactor Physics

CEA-N-2098 PC **A11**/MF **A01**
CEA Centre d'Etudes Nucleaires de Cadarache, Saint-Paul-les-Durance (France). Dept. des Reacteurs a Eau.
Study of Plutonium Recycling Physics in Light Water Reactors.
P. Reuss. Oct 79, 229p
In French.Thesis.
U.S. Sales Only.

A stock of plutonium from the reprocessing of thermal neutron reactor fuel is likely to appear in the next few years. The use of this plutonium as fuel replacing exp 235 U in thermal reactors is probably more interesting than simple stock-piling storage: immobilization of a capital which moreover would deteriorate by radioactive decay of isotope 241 also fissile and present to an appreciable extend in plutonium from reprocessing (half-life 15 years); recycling, on the other hand, will supply energy without complete degradation of the stock for fast neutron reactor loads, the burned matter having been partially renewed by conversion; furthermore the use of plutonium will meet the needs created by a temporary pressure on the naturel and/or enriched uranium market. For these two reasons the recycling of plutonium in thermal neutron reactors is being considered seriously today. The present work is confined to neutronic aspects and centres mainly on pressurized water-moderated reactors, the most highly developed at present in France. Four aspects of the problem are examined: 1. the physics of a plutonium-recycling reactor special features of neutronic phenomena with respect to the 'conventional' scheme of the exp 235 U burning reactor; 2. calculation of a plutonium-recycling reactor: adaptation of standard methods; 3. qualification of these calculations from the viewpoint of both data and inevitable approximations; 4. the fuel cycle and particularly the equivalence of fissile matters. (Atomindex citation 11:522911)

CNEN-RT/ING-79-33 PC **A03**/MF **A01**
Comitato Nazionale per l'Energia Nucleare, Rome (Italy).
Validation Tests Codes Morse C.G. and Keno IV.
P. A. Landeyro. 1979, 50p
U.S. Sales Only.

The Monte Carlo computer codes Morse and Keno IV are employed to calculate critical experiments of various geometries, materials, and isotopic composition. It is concluded that reliable criticality safety calculations can be made for a wide range of system of general interest, provided the limits of validated applicability are not exceeded. (Atomindex citation 11:508899)

TU-Inf-05-28-79 PC **A02**/MF **A01**
Technische Univ., Dresden (German D.R.). Sektion Physik.
Determination of the Neutron Spectrum with Activation Probes in the Ionization Chamber Channel of a WWER-440 Type Reactor.
J. Goebel, F. Guehne, G. Streubel, K. Prokert, and B. Doerschel. 1979, 7p
In German.
U.S. Sales Only.

The spectral neutron flux density at core level has been determined by activation probes in an ionization chamber channel of the third unit of the Greifswald nuclear power plant. The results obtained render possible to assess the influence of non-thermal parts of the neutron flux density on the output signals of the ionization chambers serving for reactor control of WWER-440 type reactors. (Atomindex citation 11:511362)

19.

ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A089 604/3 PC **A04**/MF **A01**
Daedalean Associates Inc Woodbine MD
Research and Development of a Controlled Cavitation Erosion (CONCAVER) (trademark) Demilling System for Demilling Explosive Warheads.
Technical rept.,
Dwight R. Koogle, and William H. Bohli. Jul 80, 57p Rept no. DAI-DRK-7903-A-001-TR
Contract N00014-79-C-0423

During the normal development cycle of an explosive weapon system, a method for the eventual removal of the explosive from the warhead must be developed. Then, when a particular weapon has become obsolete, the warheads are returned to an explosive ordnance station and the explosive is removed by demilling. This demilling can be accomplished either by blasting with a 'water jet' or actual mechanical milling on a milling machine. The first method is brute force in nature and has many limitations; the second method is dangerous in that heat can be generated by the tool thereby raising the chance of an explosion. What is needed is a system that can quickly and safely remove explosive material from warheads. (Author)

AD-A089 613/4 PC **A03**/MF **A01**
SRI International Menlo Park CA Organic Chemistry Dept
Preparation and Purification of HMX and RDX Intermediates (TAX and SEX).
Final rept. 1 Dec 79-30 Apr 80,
Clifford D. Bedford, Steven J. Staats, Maria A. Geigel, and Donald L. Ross. May 80, 34p
Contract DAMD17-80-C-0013

This report describes the feasibility of preparing 4 kg each of 1-acetylhexahydro-3.5-dinitro-1,3,5-triazine (TAX) and 1-acetyloctahydro-3,5,7-trinitro-1,3,5,7-tetrazocine (SEX). TAX was prepared by nitrolysis of 1,3,5-triacetylhexahydro-1,3,5-triazine (TRAT) using a mixture of trifluoroacetic anhydride (TFAA) and 100% nitric acid. The crude TAX, contaminated with 5% to 30% RDX, was obtained analytically pure (99.9+%) by open column chromatography on silica gel using a 1:1 mixture of nitromethane/dichloromethane as eluent. SEX was prepared by nitrolysis of 1,5-diacetyloctahydro-3,7-dinitro-1,3,5,7-tetrazocine (DADN) using a mixture of trifluoroacetic anhydride and 100% nitric acid. The crude SEX was contaminated with 50% DADN, HMX, or both, depending on the reaction conditions. Soxhlet extraction of the crude SEX with ethyl acetate affords 80% SEX with 20% DADN contaminated. Because the major problem is not the synthesis of SEX but its purification, additional methods for purification and further examination of solvent systems used for extractive and chromatographic separations should be explored to obtain analytically pure SEX.

AD-A089 632/4 PC **A02**/MF **A01**
Army Electronics Research and Development Command Fort Monmouth NJ Electronics Technology and Devices Lab
Reliability Evaluation of Plastic Encapsulated Hybrid Microcircuits Developed for Army Fuze Applications.
Technical rept.,
Edward B. Hakim, and John Erickson. Aug 80, 23p Rept no. DELET-TR-80-16

A major Army rocket system may incorporate the use of an electronic fuze timer fabricated using two plastic encapsulated hybrid microcircuits and one encapsulated monolithic integrated circuit. The Electronics Technology and Devices Laboratory at Fort Monmouth, New Jersey was tasked with assessing the storage reliability of these devices through accelerated testing and detailed failure analysis to determine failure mechanisms. From this analysis, corrective actions would be proposed which could permit attainment of the desired reliability. (Author)

AD-A089 646/4 PC **A05**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Yawsonde Data for M687-Type Projectiles with Application to Rapid Spin Decay and Stewartson-Type Spin-up Instabilities.
Final rept.,
W. P. D'Amico, W. H. Clay, and A. Mark. Jun 80, 82p ARBRL-MR-03027, AD-E430 490
Supersedes Rept. no. ARBRL-IMR-632.

Specially prepared M687 projectiles were tested at Wallops Island, Virginia, on 28 September 1977 and 3 May 1978. Yawsonde data were obtained for all flights. The payload canisters were one piece cylinders of M687-type except that several of the canisters had heights that were non-standard. In an attempt to reproduce previously observed anomalous despin effects for M687 shell at shot exit, several types of liquids with fill ratios of 90 or 100% were tested at yaw levels up to ten degrees. The raw data from the projectiles tested did not indicate anomalous effects at shot exit, and these effects have only been observed when simulant-loaded binary canisters with burst discs were employed. It is most probable that the burst discs precipitate the anomalous spin behavior. Yawsonde data were also obtained for 100% filled canister whose height was selected to produce a Stewartson-type instability during liquid spin-up. The flight data from one unstable round was consistent with computations of spin-up eigenfrequencies from recently developed methods. (Author)

PAT-APPL-6-160 350 PC **A02**/MF **A01**
Department of the Navy Washington DC
Liquid Propellant.
Patent Application,
Joseph Mastroianni, and William F. Newton. Filed 17 Jun 80, 9p AD-D007 455/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A liquid monopropellant, suitable as a gun propellant, is obtained from a liquid composition comprising from about 70 to about 95 weight percent of a liquid nitrated organic compound and from about 5 to 30 weight percent of a diester represented by the formula ROOC(CH2)n COOR wherein R represents an alkyl of 3 to 5 carbon atoms and n is either 5 or 7. (Author)

19D. Explosions, Ballistics, and Armor

AD-A089 163/0 PC **A04**/MF **A01**
Army Land Warfare Lab Aberdeen Proving Ground MD
Protective Garments for Public Officials.
Final rept.,
Nicholas Montanarelli, Clarence E. Hawkins, Michael A. Goldfarb, and Terrance F. Ciurej. Aug 73, 61p Rept no. LWL-CR-30B73

This task has been a 12-month project to develop an inconspicuous, lightweight, external garment (top coat or sport coat) for use by public officials to defeat the .38 caliber special threat. Several promising protective materials were evaluated for their ballistic properties. The material known as PRD-49-IV was superior to all other materials tested, and it was then used to tailor an acceptable external garment. The ballistic penetration tests consisted of firing several types of ballistic projectiles with a threat severity equivalent to or less than that of the 0.38 caliber special at panels of candidate materials. The test conditions were compatible with National Bureau of Standards requirements. Blunt trauma effects were observed in animals wearing panels of protective material. (Author)

AD-A089 300/8 PC **A05**/MF **A01**
Civil Engineering Lab (Navy) Port Hueneme CA
Design Criteria for Soil Cover Over Box-Shaped Ammunition Magazines.
Final rept. Sep 79-Mar 80,
W. A. Keenan, and L. C. Nichols. May 80, 100p Rept no. CEL-TR-878

Theory is formulated for effects of an internal explosion on the dynamic response and behavior of the earth-bermed roof of box-shaped ammunition storage magazines. The theory considers the ratio of charge weight to magazine volume, scaled vent area of the magazine, depth and density of soil cover, characteristics of the roof slab, and the net explosive weight of storage. Predictions from theory are correlated with experimental data derived from field tests in which HE charges were detonated inside small-scale, box-shaped ammunition magazines. Test variables were depth of soil cover, soil density, and net explosive weight. Excellent agreement was found between the measured and predicted response of the roof over the entire history of response. Theory is translated into design criteria for the minimum depth of soil cover required over the roof of a box magazine in order to mitigate the debris hazard and/or contain explosion effects from an inadvertent explosion. Problem solutions are presented to illustrate applications of the theory and design criteria. Results have positive implications in the future design and siting of ready service and special weapons magazines and missile test cells which typically have a small ratio of net explosive weight to magazine volume. Further, results offer a rational basis for designing physical security and survivability attributes into construction standards which deviate from established standards without degrading the level of explosives safety. (Author)

AD-A089 487/3 PC **A10**/MF **A01**
Range Commanders Council White Sands Missile Range NM Data Reduction and Computing Group
Data Reduction and Analysis Techniques for Miss-Distance Determination (MDD) and Scoring Systems.
Final rept.
Sep 80, 225p Rept no. DR/CG-130-80
Supersedes Rept. no. DR/CG-130-75, AD-A020 087.

The purpose of this document is to describe, under a single cover, the data reduction techniques, advantages, disadvantages, accuracies, cost estimates, and reliability factors associated with the various types of miss-distance determination (MDD), miss-distance indicator (MDI), and scoring systems in use at the various ranges.

19F. Guns

AD-A089 258/8 PC **A03**/MF **A01**
Army Weapons Command Rock Island IL General Thomas J Rodman Lab
Stress Analysis of 155mm Towed Howitzer XM198, Serial Numbers 3 through 10 - Cradle.
Technical note,
Catherine M. Robinder, and David E. Hebdon, Jr. Jan 73, 40p Rept no. SWERR-R-TN-1-73

A stress analysis of the cradle of the 155mm Howitzer, XM198, has been performed by the Research Directorate, Weapons Laboratory (WECOM). The calculations of the stresses for the weapons with serial numbers 3 through 10, are given in the Technical Note. Standard stress analysis techniques were used throughout the study. The cradle can withstand the loads that are anticipated in the firing of the weapon. (Author)

AD-A089 681/1 PC **A07**/MF **A01**
Chrysler Corp Detroit MI Defense Engineering Div
Conceptual Design of a Rotating Breech Automated Ammunition Handling System.
Final rept.
14 Feb 80, 128p
Contract DAAK10-79-C-0164

By utilizing the recoil energy of the cannon to rotate only a portion of the cannon, the breech can be automatically positioned to load quickly. The breech would return to the same loading position (relative to the cab) after firing, which would also be conducive to an automated loading system. The projectile and propellant charge will still be fuzed and zoned manually. The following are among the specified objectives of this project: Fire 3 rounds in 10 seconds; Fire 2 rounds per minute, sustained; Provide manual back-up; Capable of firing cannon launched guided projectiles manually; Capable of operating at -50 F through + 160 F ambient temperature; Capable of operating through 360 deg turret rotation and 0 to 70 deg

cannon elevation; Capable of handling rigid consumable case propellant; Capable of handling future propellants; Breech must withstand 60,000 psi and 2,500,000 lb force; Design elements must be modular; Designed for easy incorporation of future product improvements; Provide appropriate ramming force; Compatible with present and future fire control; and Must be technically feasible.

20.
PHYSICS

20A. Acoustics

AD-A089 367/7 PC **A07**/MF **A01**
Naval Research Lab Washington DC
Modal Acoustic Transmission Loss (MOATL): A Transmission-Loss Computer Program Using a Normal-Mode Model of the Acoustic Field in the Ocean.
Interim rept.,
John F. Miller, and Stephen N. Wolf. 27 Aug 80, 129p Rept no. NRL-8429

A FORTRAN program which calculates coherent and incoherent acoustic transmission loss is described. The program is based on normal-mode theory of ocean acoustics. The theory models the ocean as two fluid layers, each with an arbitrary sound-speed profile, which overlay a uniform half-space. The half-space may be a fluid or a shear-supporting solid. The model incorporates losses due to acoustic absorption in all three media and losses due to roughness of the upper and lower boundaries of the upper fluid layer. An acoustic environment changing slowly with range is treated using the adiabatic approximation. (Author)

AD-A089 455/0 PC **A02**/MF **A01**
Rockwell International Anaheim CA Autonetics Group
Electronic Distribution and Summing Element (EDSE).
Final rept.,
E. Loya. 9 Jan 76, 4p

The EDSE module consists of an 11 by 13.6 inch stitchwire card with voltage and ground planes and with 175 dual-in-line ICs installed. The module has an interface capability of 176 lines, provided by two 88 pin connectors. The ICs used in the EDSE module are 10,000 series ECL circuits with a basic master clock rate of 26 MHz. This was required so that the EDSE could be used in a simulated hydrophone array as large as 2048 hydrophones. The EDSE module contains the digital circuitry to simulate two hydrophone outputs, plus interface with an input data source and other EDSE modules in the acoustic array simulator. A more detailed description of the EDSE module circuits and operation and timing is found in the EDSE Technical Manual. An EDSE Self-Test Chassis and a Self-Test module were constructed to checkout and self-test the EDSE module. The self-test chassis contains a muffin fan for cooling the EDSE module during test. The cooling fan was considered necessary since the EDSE module draws approximately 15 amps at -5 volt power during operation. During testing, it was found that the EDSE module stabilized at approximately 65 C during operation with the cooling fan turned off. The module exhibited no malfunctions due to operating at this elevated temperature.

AD-A089 504/5 PC **A02**/MF **A01**
Stanford Univ CA Edward L Ginzton Lab of Physics
A Physical Model for Acoustic Signatures,
Abdullah Atalar. 1 Jun 79, 4p GL-2978, AFOSR-TR-80-0814
Contract F49620-78-C-0098
Pub. in Jnl. of Applied Physics, v50 n12 p8237-8239 Dec 79.

No abstract available.

AD-A089 591/2 MF **A01**
Royal Aircraft Establishment Farnborough (England)
Exploratory Studies on the Design of Acoustic Splitters for Wind Tunnels.
Technical memo.,
W. J. G. Trebble. 2 Jan 80, 32p RAE-TM-AERO-1829, DRIC-BR-72353
Availability: Microfiche copies only.

This Memorandum discusses the choice of geometry and materials for acoustic splitters in wind tunnels, with particular reference to the requirements for modifying the 5ft and 24ft tunnels at RAE. The optimum theoretical design of acoustic splitters is considered first and then practical materials to match the requirements are chosen. Experimental investigations at small scale in an aeroacoustic research rig with ducted flow are described. Attention is drawn to the need for the splitters to have a good aerodynamic profile and to the problems associated with the self-noise of the splitters when they are installed in high-speed sections of the tunnel circuit. (Author)

N80-31725/8 PC **A03**/MF **A01**
Laboratorio di Ricerca e Technologia per lo Studio del Plasma nello Spazio, Frascati (Italy).
Tristatic Sodar Sodar Tristatico.
A. Ricotta, and M. Berico. Mar 80, 34p LPS-80-6 Text in Italian.

The operating principles of sodar (acoustic radar working at 1 to 3 kHz) are reviewed and a system using three modules placed at the vertices of a triangle is described. The tristatic system was developed to measure the wind total velocity vector and to explore boundary layer dynamics.

20B. Crystallography

AD-A089 456/8 PC **A07**/MF **A01**
Georgia Inst of Tech Atlanta Engineering Experiment Station
Growth and Characterization of In(1-x)Ga(x)As(y)P(1-y) and GaAs Using Molecular Beam Epitaxy.
Annual rept. 9 Feb 79-7 Feb 80,
D. W. Covington, E. L. Meeks, and W. H. Hicklin. Mar 80, 129p
Contract N00173-79-C-0033

This report describes the technical work accomplished during the first year of a two-year study of binary and quaternary semiconductors grown by molecular beam epitaxy. Research on GaAs materials demonstrated doping profiles for peeled film, mixer diodes and low-high-low, millimeter wave IMPATT diodes. Iron has been investigated as a potential MBE dopant for FET buffer layer applications. Although compensated layers exhibiting the Fe(2+) line at 0.371 eV were obtained for doping oven temperatures less than but close to 1013 C at GaAs growth rates of 1.0 micron per hr. there was unintentional accumulation of iron at the outer surface reserved for the active layer in conventional FET structures. Before initiating the study of quaternary materials, the MBE growth conditions were established for the ternary In(x)Ga(1-x)As. Layers of the latter semiconductor grown on GaAs substrates held at 510 C showed significant changes in surface morphology and electrical properties for x greater than but close to 0.3. A cryopumped MBE system containing six oven positions has been developed for growing the quaternary In(1-x)Ga(x)As(y)P(1-y) which requires relatively intense beams of P molecules. Lattice-matched In(1-x)Ga(x)As(y)P(1-y) layers have been deposited in this system on (001) GaAs substrates using ovens loaded with Ga, In, As, and GaP. Epitaxy was achieved.

N80-32247/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Experimental Techniques for Determination of the Role of Diffusion and Convection in Crystal Growth from Solution.
L. Zefiro. Mar 80, 16p NASA-TM-76131
Contract NASW-3199
Transl. into English from Rend. Soc. Ital. Mineral. Petrologia (Italy), V. 34, No. 2, 1978 p 663-673. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prepared by Genoa Univ., Italy.

Various studies of the concentration of the solution around a growing crystal using interferometric techniques are reviewed. A holographic interferometric technique used in laboratory experiments shows that a simple description of the solution based on the assumption of a purely diffusive mechanism appears inadequate since the convection, effective even in reduced columns, always affects the growth.

PB81-103269 PC **A06**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Standard X-ray Diffraction Powder Patterns. Section 17 - Data for 54 Substances,
Marlene C. Morris, Howard F. McMurdie, Eloise H. Evans, Boris Paretzkin, and Camden R. Hubbard. Oct 80, 119p NBS-MONO-25-SECT-17 See also report dated Oct 79, PB80-110364. Prepared in cooperation with Joint Committee on Powder Diffraction Standards, Swarthmore, PA. Library of Congress catalog card no. 53-61386.

Standard x-ray diffraction patterns are presented for 54 substances. The experimental x-ray powder diffraction patterns were obtained with an x-ray diffractometer. All d-values were assigned Miller indices determined by comparison with computed interplanar spacings consistent with space group extinctions. The densities and lattice constants were calculated and the refractive indices were measured in some cases.

20C. Electricity and Magnetism

AD-A089 648/0 PC **A02**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Chemical Systems Lab
Symmetry in Electromagnetic Scattering from a Cluster of Spheres.
Technical rept. Apr 78-Jun 79,
O. I. Sindoni, F. Borghese, P. Denti, and G. Toscano. Aug 80, 16p ARCSL-TR-79066, AD-E410 300

In this study, a method for calculating the scattering properties of a cluster of dielectric spheres was developed and group theory was applied to simplify the calculations. The scattered field as well as the scattering and absorption cross sections can be computed without any restriction on the angle of incidence of the light or on the radii and refractives indices of the spheres in the cluster. (Author)

20D. Fluid Mechanics

AD-A089 193/7 PC **A03**/MF **A01**
Case Western Reserve Univ Cleveland OH Dept of Macromolecular Science
Fluid Transport into Crazes under Triaxial Stress.
Technical rept.,
Abdelsamie Moet, and Eric Baer. 25 Aug 80, 33p Rept no. TR-11
Contract N00014-75-C-0795

The penetration coefficient of silicon oil (500 cS) into PS during tensile deformation was determined under a range of superposed hydrostatic pressure of 1 to 1200 bars. At atmospheric pressure, the liquid front, driven by a relatively high capillary pressure, was found to lag behind the 'dry' craze tip front. The penetrability was observed to increase as a steep linear function of the pressure up to 80 bars at which the liquid front was forced to reach the craze tip front. At higher pressures, a stage of suppressed penetrability was observed which was associated with a substantial decrease in the craze size and density. The suppressed pen-

etrability is explained on the basis of pressure-induced 'void' reduction competing with its pumping component. An effective axial strain analysis is presented to explain such a reduction. The effect of pressure on the maximum stress at the tip of a flaw, in conjunction with the distribution of surface defects, is found to account for the suppressed craze density at elevated pressures. (Author)

AD-A089 233/1 PC **A03**/MF **A01**
University of Southern California Los Angeles Dept of Aerospace Engineering
On the Formation of Nonlinear Internal Waves from the Gravitational Collapse of Mixed Regions in Two and Three Dimensions.
Technical rept. 1978-1979,
Tony Maxworthy. 22 Aug 78, 35p Rept no. USCAE-53-4514-1580
Contract N00014-77-C-0015
Pub. in Jnl. of Fluid Mechanics, v96 pt 1 p47-64 1980.

No abstract available.

AD-A089 236/4 PC **A02**/MF **A01**
University of Southern California Los Angeles Dept of Aerospace Engineering
A Note on Spanwise Structure in the Two-Dimensional Mixing Layer.
Technical rept. 1 Sep 79-30 Jun 80,
F. K. Browand, and T. R. Troutt. 22 Mar 79, 19p Rept no. USC-53-4514-1566
Contract N00014-76-C-0211, Grant NSF-ENG78-02249
Pub. in Jnl. of Fluid Mechanics, v917 pt4 p771-781 1980.

No abstract available.

AD-A089 244/8 MF **A01**
Nevada Univ Reno Desert Research Inst
An Experimental Determination of the Drag on Liquid Drops.
Final rept. 1 Jul 77-30 Jun 80,
Thomas E. Hoffer, and Phillip H. Gillaspy. 31 Jul 80, 94p ARO-14347.1-GS
Grant DAAG29-77-G-0172
Availability: Microfiche copies only.

One of the primary considerations in all types of spraying operations in where the dispensed material will impact on the ground. This impact area is determined by the trajectory of the liquid drop which can be predicted if the drag is known. Each drop, depending upon its size and physical properties, will have a slightly differing drag and consequently, trajectory. Thus, a reliable calculation of an impact area can only be done if the effects of appropriate physical properties upon the drag are known. The experiment reported herein was designed to provide the needed understanding of the effects of physical properties upon the drag of liquid drops. The fall velocity, from which the drag can be calculated, was measured for five different liquids of varying viscosity and surface tension. In addition, one of the liquids was thickened in order to change the viscosity while not affecting the surface tension, thus isolating the effect of viscosity on drag. Thickening was accomplished with two different thickeners, one of which produced non-Newtonian properties. Thus, any differences in the rheological properties of Newtonian and non-Newtonian liquids were tested. With the viscosity effects isolated, the effect of surface tension alone was then determined. (Author)

AD-A089 443/6 PC **A03**/MF **A01**
Naval Ocean Systems Center San Diego CA
Implementation and Evaluation of the Disturbance Amplification in Boundary Layers (DABL) Computer Program: A User's Manual.
Technical document,
T. S. Mautner. Mar 80, 50p Rept no. NOSC/TD-340

This report describes the implementation and evaluation of the Fortran IV computer program DABL (Disturbance Amplification in Boundary Layers) which calculates the growth of small disturbances in laminar boundary layers. (Author)

AD-A089 516/9 PC **A02**/MF **A01**
Brown Univ Providence RI Div of Applied Mathematics
Motion of Fluid with Constant Vorticity in a Singly-Connected Region,
C. H. Su. 15 Jun 78, 3p
Contract N00014-76-C-0924, Grant NSF-ENG77-00982
Pub. in Physics of Fluids, v22 n10 p2032-2033 Oct 79.

No abstract available.

AD-A089 517/7 PC **A02**/MF **A01**
Brown Univ Providence RI Div of Applied Mathematics
Steady Stratified Flows over a Long Obstacle,
W. K. Stevens, and C. H. Su. 24 Apr 78, 8p
Contract N00014-76-C-0924, Grant NSF-DES75-12853
Pub. in Physics of Fluids, v22 n8 p1428-1434 Aug 79.

No abstract available.

N80-31759/7 PC **A03**/MF **A01**
Sheffield Univ. (England). Dept. of Chemical Engineering.
Investigations of Eddy Coherence in Jet Flows.
A. J. Yule. 1980, 27p NASA-CR-163525
Grant NSG-7517
Presented at Intern. Conf. On the Role of Coherent Structures in Modelling Turbulence and Mixing, Madrid, 25-27 Jun. 1980.

In turbulent shear flow the term coherent structures refers to eddies which are both spatially coherent, i.e., large eddies, aand also temporally coherent, i.e., they retain their identities for times which are long compared with their time scales in fixed point measurements. In transitional flows, the existence of such structures is evident from flow visualizations. In many other flows, such structures are not so evident. The reasons for the existence of these two classes of flows are discussed and attention is focused upon the more difficult flows, where coherent structures are not so evident. Techniques by which the existence (or nonexistence) of such structures in these flows can be established from point measurements, are also discussed. A major problem is shown to be the need to discriminate between real losses in eddy coherence and apparent losses in coherence introduced by phase scrambling effects which 'smear' multipoint correlations. The analysis of multiprobe time dependent data in cold and reacting round turbulent jets is described and it is shown how evidence of strong eddy coherence can be extracted from data.

N80-31771/2 PC **A03**/MF **A01**
Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
A Study into the Use of a Photon Correlation Technique in Both Low and High Speed Flows.
R. S. Figliola, and G. Vorropoulus. Feb 80, 34p VKI-TM-27

A laser anemometer system using a photon correlation technique in conjunction with a dual beam-Doppler difference optical system was tested. An introduction to the technique is presented. Correlograms were obtained in both low and high speed flows having various degrees of turbulence. Comparisons are made with measurements from a pitot-static tube, a hot-wire anemometer, and a period counter processor. The technique obtained good results even at extremely low light levels with signals of poor signal to noise ratio at velocities up to M = 1.2.

20E. Masers and Lasers

AD-A089 211/7 PC **A19**/MF **A01**
Physical Sciences Inc Woburn MA
Analysis of Laser-Target Interaction. Volume I. Theory.
Final rept. 16 Dec 77-15 Dec 78,
R. G. Root, A. N. Pirri, P. K. S. Wu, and H. Gelman. Mar 79, 434p Rept no. PSI-TR-170A-VOL-1
Contract DAAK40-78-C-0010

This work was divided into three areas: theoretical studies of pulsed laser interaction with metals; theoretical studies of the interaction of repetitively pulsed 10.6 micrometers lasers with dome materials; and first order concepts in the hardening of metals to repetitively pulsed radiation. Part I is devoted to theoretical studies of pulsed laser interaction with metals. The model for central thermal coupling to A12024 targets via plasma reradiation is improved by incorporating axial radiative transport within the plasma. The model is extended to include other metal alloy targets such as SS304, steel 4130 and Ti6Al4V. Based on absorbed fluence, a hierarchy is predicted for the metal targets. The model is also adapted to incorporate laser beams incident at oblique angles. The theory predicts substantial thermal and mechanical coupling at large angles of incidence, and the theoretical predictions are verified by the 1978 JANAF data. Part II deals with the interaction of pulsed 10.6 micrometers radiation with dome materials. First, theoretical models are advanced for the surface interaction of a pulsed laser with dome materials. A model is developed for repetitive pulse damage to fiberglass, based on delamination and the concept of a maximum amount of fluence per pulsed (called residual energy) which can be used to cause delamination.

AD-A089 286/9 PC **A06**/MF **A01**
Naval Postgraduate School Monterey CA
Stark Cell Stabilization of a CO2 Laser.
Master's thesis,
Larry Edward Knolhoff. Mar 80, 115p

Studies have been conducted of the frequency stabilization of the output from a Sylvania 941 Carbon Dioxide laser by active comparison with a Stark-tuned NH2D line center in an absorption cell. A dithered Stark voltage gave a peak-detection correction signal fed back to a PZT mounted laser resonator mirror to control the cavity optical length. Operation of an integrator incorporated in the feedback loop to improve the system stability has been investigated. A method was demonstrated of using the integrator to locate the desired laser vibronic transition by scanning the laser through its spectral signature prior to initiation of servo operation. An unexpected discontinuity in the absorption lineshape of a Stark-tunable cell was discovered which made the cell unsuitable for generation of the feedback signal. A new and more versatile Stark cell was designed for test and evaluation of cell plate configuration and fabrication. (Author)

AD-A089 558/1 PC **A02**/MF **A01**
Stanford Univ CA Edward L Ginzton Lab of Physics
Exact Cavity Equations for Lasers with Large Output Coupling,
A. E. Siegman. 4 Sep 79, 4p GL-3072, AFOSR-TR-80-0777
Contract F49620-77-C-0092
Pub. in Applied Physics Letters, v36 n6 p412-415, 15 Mar 80.

No abstract available.

AD-A089 559/9 PC **A02**/MF **A01**
Rochester Univ NY Dept of Physics and Astronomy
Quantum Theory of a Two-Mode Laser with Coupled Transitions,
Surendra Singh, and M. S. Zubairy. 30 Jul 79, 14p AFOSR-TR-80-0779
Grant AFOSR-76-2918
Pub. in Physical Review A, v21 n1 p281-292 Jan 80.

No abstract available.

AD-A089 560/7 PC **A02**/MF **A01**
United Technologies Research Center East Hartford CT
Pressure Broadened Linewidths in the 2.5 micron Band of HF and the Influence of Polymer Formation,
J. J. Hinchen, and R. H. Hobbs. 22 Dec 78, 5p AFOSR-TR-80-0839
Contract F44620-76-C-0112
Pub. in Jnl. of the Optical Society of America, v69 n11 p1546-1549 Nov 79.

No abstract available.

AD-A089 614/2 PC **A04**/MF **A01**
Aerospace Corp El Segundo CA Aerophysics Lab

Experimental Studies of Annular (HSURIA) Resonators Including Polarization Effects.
Interim rept.,
R. A. Chodzko, S. B. Mason, and E. B. Turner.
15 Aug 80, 57p TR-0080(5605)-1, SD-TR-80-51
Contract F04701-79-C-0080

A repetitively pulsed CO2 laser facility was developed for testing annular resonators. The large-aperture device exhibits generally uniform gain over an annular region of 18-cm outer and 10-centimeter inner diameter. The half-symmetric unstable resonator with internal axicon (HSURIA) was tested at equivalent Fresnel numbers up to 4.5. This resonator design incorporates a W-axicon mirror beam compactor that transforms a cylindrical mode region into an annular mode region. Two HSURIA configurations were evaluated (1) with a rear conical mirror and (2) with a rear flat mirror in the annular leg. (Author)

PATENT-4 213 102 Not available NTIS
Department of the Air Force Washington DC
Fluorine Generator for Chemical Lasers.
Patent,
Walter R. Warren, Jr., Donald A. Durran, and Donald J. Spencer. Filed 21 Mar 78, patented 15 Jul 80, 5p AD-D007 438/5, PAT-APPL-888 813
Supersedes PAT-APPL-888 813-78, AD-D004 938.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A system for generating fluorine for use as a gaseous reactant in a chemical laser from a storable gas supply of NF3 is disclosed.

PB81-104358 Not available NTIS
National Bureau of Standards, Washington, DC.
A Small, Passively Operated Hydrogen Maser.
Final rept.,
D. A. Howe, F. L. Walls, H. E Bell, and H. Hellwig. 1979, 14p
Pub. in Proc. Annual Frequency Control Symposium (32nd), Atlantic City, NJ., May 3-June 1, 1979 p554-568 1979.

A compact passive hydrogen maser with many unique features, including a significant reduction in size over previous hydrogen masers, is described. It uses the passive mode of operation, thereby permitting use of a small microwave cavity which is dielectrically loaded by a low-loss alumina(Al2O3). The cavity is 14.6cm O.D. and 13.7cm high, weighing only 4.4kg. The unloaded cavity Q factor is about 6000. The teflon coated quartz bulb which is common in other masers has been replaced by a teflon coating on the inside wall of the cavity. This has yielded a simpler design and more rugged H-maser package.

PB81-800088 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Carbon Dioxide Lasers. 1978-August, 1980 (Citations from the NTIS Data Base).
Rept. for 1978-Aug 80,
Diane M. Cavagnaro. Oct 80, 220p
Supersedes NTIS/PS-79/1068, and NTIS/PS-78/0896. See also 1970-1974, NTIS/PS-75/473, 1975-May, 1976, NTIS/PS-77/0709, and 1976-1977, NTIS/PS-79/1067.

Citations on theory, design, operation, output and diagnostics of CO2 lasers are presented. Studies relating to excitation, frequency conversion, modulation, laser pumping, reaction kinetics, gas dynamics, and plasmas are included. The development and efficiency of optical components; such as mirrors, resonators, tuning devices, infrared optical materials, amplifiers, and gratings are also discussed. (This updated bibliography contains 214 citations, 70 of which are new entries to the previous editon.)

20F. Optics

AD-A089 197/8 PC **A04**/MF **A01**
Optical Sciences Co Placentia CA
Analysis of Advanced CI Applications and Systems Performance.
Interim rept. Oct 79-Mar 80,
David L. Fried. Jun 80, 56p DR-169, RADC-TR-80-219
Contract F30602-79-C-0062, ARPA Order-2646

In this report three problems associated with compensated imaging and adaptive optics are considered. Chapter 1 is concerned with the matter of the effect of turbulence induced intensity variations at an aperture upon the antenna gain achievable when the aperture is used as a laser transmitter. Chapter 2 treats a problem related to image recovery from speckle interferometry data - namely the question of ambiguity in the result when the image recovery is based on nonnegativity of intensity. Chapter 3 examines a concept for producing low voltage multielement adaptive optics deformable mirrors.

AD-A089 226/5 PC **A02**/MF **A01**
Stanford Univ CA Edward L Ginzton Lab of Physics
Nonlinear-Optical Calculations Using Fast-Transform Methods: Second-Harmonic Generation with Depletion and Diffraction,
Shinan-Chur Sheng, and A. E. Siegman. 14 Sep 79, 19p GL-3060, AFOSR-TR-80-0651
Contract F49620-77-c-0092
Pub. in Physical Review A, v21 n2 p599-606 Feb 80.

No abstract available.

AD-A089 403/0 PC **A02**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Veiling Glare from Spectacles and Visors in Aviation,
B. A. J. Clark. Apr 79, 16p Rept no. ARL/SYS NOTE-67

Veiling glare from surface scratches, turbidity and fluorescence in spectacles and visors may have a significant effect on the vision of pilots. The problems of measuring the stray light produced by these items are indicated, and results of some actual measurements are presented in the form of a single index for each sample uner representative conditions. Such an index may provide a way of avoiding premature replacement of expensive items, as well as indicating items which have become a flight safety hazard. The techniques appear suitable for extension to aircraft transparencies, and to related fields such as the effects of veiling glare on the vision of motor vehicle drivers. (Author)

AD-A089 404/8 PC **A03**/MF **A01**
Aerospace Corp El Segundo CA Materials Sciences Lab
Figures of Merit for Mirror Materials.
Interim rept.,
Ernest G. Wolff. 10 Jul 80, 43p TR-0080(5762-02)-1, SD-TR-80-35
Contract F04701-79-C-0080, DARPA Order-3646

Potential mechanisms that result in excessive wavefront distortions by large mirrors are reviewed, with the objective of defining the mirror substrate material property requirements in each case. A generalized figure of merit is found to require maximal thermal conductivity, elastic modulus, strength, melting point, and dimensional stability. The thermal expansion coefficients and their variability must be minimized. The analyses can be used to optimize mirror design and materials for a wide range of mechanical and thermal loading conditions. (Author)

AD-A089 556/5 PC **A02**/MF **A01**
Texas Tech Univ Lubbock Dept of Electrical Engineering
Space-Variant Coherent Optical Processing,
John F. Walkup. 12 Nov 79, 9p AFOSR-TR-80-0889
Grants AFOSR-79-0076, AFOSR-75-2855
Pub. in Optical Engineering, v19 n3 p339-346 May-Jun 80.

No abstract available.

AD-A089 562/3 PC **A02**/MF **A01**
Rochester Univ NY Dept of Physics and Astronomy
Beyond the Mean-Field Theory of Dispersive Optical Bistability,
Rajarshi Roy, and M. S. Zubairy. 30 Jul 79, 9p
AFOSR-TR-80-0830
Grant AFOSR-76-2918
Pub. in Physical Review A, v21 n1 p274-280 Jan 80.

No abstract available.

N80-31715/9 PC **A02**/MF**A01**E
Fondazione Ugo Bordoni, Rome (Italy).
Propagation in Dielectric Guides Propagazione in Guide Dielecttriche.
P. Diporto. Jun 79, 21p FUB-6-1979
Text in Italian.

The theory of electromagnetic wave propagation in optical fibers is reviewed. Equations for step-index and graded-index fibers are developed. The numerical aperture, mode delay, impulse response, chromatic and modal dispersion, and other concepts related to fiber optics are examined.

N80-31777/9 PC **A04**/MF **A01**
United Technologies Research Center, East Hartford, CT.
Design, Fabrication and Testing of an Optical Temperature Sensor.
W. W. Morey, W. H. Glenn, R. O. Decker, and W. C. Mcclurg. Jul 80, 54p NASA-CR-165125, R80-924624-11
Contract NAS3-21841

The laboratory breadboard optical temperature sensor based on the temperature dependent absorptive characteristics of a rare earth (europium) doped optical fiber. The principles of operation, materials characterization, fiber and optical component design, design and fabrication of an electrooptic interface unit, signal processing, and initial test results are discussed. Initial tests indicated that, after a brief warmup period, the output of the sensor was stable to approximately 1 C at room temperature or approximately + or - 0.3 percent of point (K). This exceeds the goal of 1 percent of point. Recommendations are presented for further performance improvement.

N80-31821/5 PC **A02**/MF **A01**
Laboratorium fuer Betriebsfestigkeit, Darmstadt (Germany, F.R.).
Local Approach to Problems of Fatigue Crack Growth.
H. Fuhring. 1979, 11p ICAF-1143
Transl. into English from Sitzung des Arbeitskreises Betriebsfestigkeit (Stuttgart), 1979 p 509-518.

Fatigue fracture mechanics attempts to express crack growth as a function of local quantity, either the cyclic strain variation or the range of the stress intensity factor above the crack opening level, so that the damage is reduced to a few pure fatigue mechanisms. This approach to crack growth problems permits the introduction of data resulting from any confirmed knowledge of material behavior (environmental effects, hardening, softening, three dimensional plasticity effects, etc.). Fundamental studies interpreting the role of crack closure on crack growth are reviewed. These consider constant amplitude crack tip stress and strain states as well as crack surface displacements under variable amplitude loading. A computer program was developed for calculating the load sequences and for deriving the N curve. Predictions using only basic structural and material data vary by a factor of plus or minus 2 compared with experiments.

N80-32219/1 PC **A02**/MF **A01**
Fondazione Ugo Bordoni, Rome (Italy).
Measurement of the Index Profile of Optical Fibers by the Refraction Method la Misura Del Profilo d'Indice di Fibre Ottiche Con il Metodo di Rifrazione.
L. Muzii. Jul 79, 24p FUB-13-1979
Text in Italian.

A device to measure the functional characteristics of optical fibers by the refracted near field method is described. The basic theory is reviewed and experimental results presented. The optical system using a 6300 A laser source and the measuring procedure are detailed. Errors are + or - 1 micron for the diameter, + or - 0.005 for the aperture, and

+ or - 0.1 for the alpha exponent. The effect of anomalous profiles on the measured results are discussed.

20G. Particle Accelerators

AD-A089 303/2 PC **A99**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Transactions of the All-Union Conference (2nd) on Charged Particle Accelerators, Moscow, 11-18 November 1970. Volume I,
A. L. Mints, A. A. Komar, A. A. Vasil'yev, E. L. Burstein, and Ye. S. Mironov. 18 Jul 80, 1148p
Rept no. FTD-ID(RS)T-0692-80
Unedited machine trans. of Trudy Vtorogo Vsesoyuznogo Soveshchaniya po Uskoritelyam Zaryazhennykh Chastits (USSR) v1 p1-273 1972.

No abstract available.

CEA-CONF-4573 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
600 MeV Saclay Linac Facilities: The Experimental Program and its Limitations Due to the Machine Characteristics.
C. Schuhl. 1979, 10p CONF-790143-5
Conference on future possibilities for electron accelerators, Charlottesville, VA, USA, 8 Jan 1979.
U.S. Sales Only.

The ALS at Saclay has now been in operation for more than 40,000 hours since 1969 and still remains alone in the energy field from 400 to 600 MeV for electrons at 1% duty cycle. Choosing experiments in three specific domains, we show the limitations on physics results due to the real characteristics of the electron beams. These domains are: electron elastic and inelastic scattering, electron quasi-elastic scattering with coincidence measurements, and photonuclear production. In experimental set up we are at a state where the experimental results are limited by the qualities of the electron beams, i.e. energy, energy spread, emittance, duty cycle, and stability. Some possible Saclay Linac evolutions are examined for increasing its duty cycle and total energy. (Atomindex citation 11:508838)

DL/SCI/P-205A PC **A02**/MF **A01**
Science Research Council, Daresbury (England). Daresbury Lab.
Proposed European Synchrotron Radiation Facility.
D. J. Thompson. Oct 79, 16p CONF-791176-3
Japan-USA seminar on synchrotron radiation facilities, Honolulu, HI, USA, 5 Nov 1979.
U.S. Sales Only.

A feasibility study has been carried out for the European Science Foundation of a 5 GeV electron storage ring intended as a very intense dedicated source of x-radiation. The specification calls for beam ports with specified spectral characteristics, and for maximum intensity, brightness, and stability together with an optimum time structure for the beam. This paper describes how the design of the storage ring was derived to meet the specification. The magnet lattice is given and other design features are briefly described. (Atomindex citation 11:508846)

FRNC-TH-876 PC **A07**/MF **A01**
Paris-6 Univ. (France).
Study of a Monte Carlo Program for the Cello Experiment.
M. Lagraa. 1979, 131p
In French.Thesis.
U.S. Sales Only.

In the first part, the experimental Cello device is presented and the physics of the electron-positron collision rings in the Petra energy domain is discussed. In the second part, a detailed study is presented of the program that generates the e exp + e exp - reactions and simulates the answer of the detectors to these reactions. Such a program is necessary to make allowance for the true physical breaks due to the geometry of the detectors and in consequence is indispensable for the analysis of the rough data of the experiment. (Atomindex citation 11:517948)

JINR-R-11-12374 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Calculation of Magnetic Fields to Correct Charged Particle Trajectories in the JINR Synchrophastron.
E. P. Zhidkov, I. B. Issinskii, T. P. Kochkina, E. M. Kulakova, and L. A. Smirnova. 1979, 10p
In Russian.
U.S. Sales Only.

The problem of calculating correcting currents in the conductors positioned in the straight sections to correct vertical beam position is presented. The algorithm of computer analog of the Newton method is presented. The results obtained demonstrate the possibility of correcting vertical trajectories at a given configuration of the synchrophasotron magnetic field up to value less than 1 cm, which could be quite acceptable from the point of view of allowance for trajectory deflection. (Atomindex citation 11:508873)

JINR-9-12346 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Calculation of Allowances for Element Parameters of a Matched Straight Insertion of the Synchrotron.
I. A. Shelaev, and I. P. Yudin. 1979, 13p
In Russian.
U.S. Sales Only.

The effect of perturbations in magnetic elements of a matched straight insertion is studied by means of numerical calculations. For a given momentum spread of beam particles the effect of lens longitudinal alignment errors and allowances for lengths and gradients of quadrupole lenses in matched insertion on maximum of beta -function beta /sub max/ and betatron oscillations frequency (nu) are calculated. The changes of beta /sub max/ and nu are connected with amounts of allowances for parameters xi /sub i/ by means of coefficients alpha /sub xi//sub i/). These coefficients are calculated by means of a written FORTRAN program. The results allow one to estimate a necessary aperture spare lenses which is equal to approximately 2.5% of unperturbed beam size. (Atomindex citation 11:508840)

KFTI-79-21 PC **A02**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Stage Generator Calculation.
I. T. Venevtsev, G. M. Skoromnyi, and E. I. Revutskii. 1979, 21p
In Russian.
U.S. Sales Only.

An engineering calculation of the cascade generator (CG) is made for the two schemes used widely in accelerating techniques, for the stable and pulse regimes of loading. The order of the CG calculation at stable loading is shown, as well as the calculation order at pulse loading for the example of the calculation of high voltage CG(70V, 0.25 A, 500 mu s, 100 Hz). The calculation error is checked at the CG-300 (in operation) and at the low-voltage CG-700 model, and is 1-4% for delta U and deltaU and not worse than 6% for other values. (Atomindex citation 11:508860)

20H. Particle Physics

AD-A089 557/3 PC **A02**/MF **A01**
Oregon Univ Eugene Dept of Physics
Relativistic K-Shell Auger Rates, Level Widths, and Fluorescence Yields,
Mau Hsiung Chen, Bernd Crasemann, and Hans Mark. 30 May 79, 7p AFOSR-TR-80-0776
Grants AFOSR-79-0026, DAAG29-78-G-0010
Pub. in Physical Review A, v21 n2 p436-441 Feb 80. Sponsored in part by NGR-38-003-036.

No abstract available.

FRNC-TH-858 PC **A08**/MF **A01**
Paris-6 Univ. (France).
Comparative Study of 9 GeV/C pi exp - Interactions on Deuterons and Neutrons with Production of Four Charged Particles.
M. C. Touboul. 1978, 158p
In French.Thesis.
U.S. Sales Only.

The two reactions pi exp - d implies pi exp - pi exp + pi exp - d and pi exp - n implies pi exp - pi exp + pi exp - n are studied by the classical cut method in a longitudinal momentum space and by a multidimensional analysis. The 3 pi systems produced diffractively are broken down into partial waves by Ascoli's analysis. The contributions of natural and non-natural exchanges in the reactions pi exp - n implies rho exp 0 delta sub 1236- , pi exp - n implies rho exp 0 delta sub 1900- and pi exp - n implies rho exp 0 (pi exp - n) are estimated. The reactions pi exp - d implies rho exp 0 pi exp - d and pi exp - n implies rho exp 0 pi exp - n are then described by a reggeized Deck pi rho exchange model. A comparison of diffractive three-pion production on neutrons and on deuterons is made. (Atomindex citation 11:512377)

FRNC-TH-872 PC **A08**/MF **A01**
Paris-11 Univ., Orsay (France).
Comparative Study of the Excitation Functions of Nuclear Reactions Induced by Light Ions (Protons and alpha) and Heavy Ions (Ne, Ca, Ar) and, after Neutron Evaporation, Leading to Platinum and Polonium Isotopes. Analysis by de-Excitation Programs Allowing for the Angular Momentum and Fission.
B. Lagarde. 1979, 175p
In French.Thesis.
U.S. Sales Only.

The de-excitation of heavy nuclei from the Pt - Po area obtained by the complete fusion of various projectiles (p, exp 3 He, exp 4 He, exp 20 Ne, exp 40 Ar and exp 40 Ca) and targets was studied. The aim was to create from different couples the same compound nucleus of a mass equal to the sum of the masses of the component parts. The excitation energy of the system thus created can vary between 60 and 120 MeV. The study of one or more particular de-excitation channels performed by measuring the cross sections of residual nuclei production for various bombardment energies is a very conventional approach. An in-depth examination was made of the effect of the angular momentum given to the compound nucleus by the input channel to the de-excitation processes. The population of orbital angular momenta depends essentially on the mass of the projectile at equal velocities. Consequently, the utilization of projectiles extending from the proton to mass 40 covers a wide range. Decay by neutrons is not the only de-excitation method. Fission has a significant role, particularly for the Po's, and consequently this strongly diminishes the probability (P,xn). The decay of (alpha ,xn) when going from the compound nucleus of exp 204 Po to exp 182 Pt makes it possble to evaluate the importance of the phenomenon and to have an item of experimental information that can be compared to a theoretical calculation. Theoretical calculations using the 'ALICE' code, which expresses schematically the reduction in level densities by subtracting from the excitation energy a rotation energy, and the 'JULIAN' code, which uses a more accurate level density calculation and takes into account the gamma emission competing with the emission of neutrons, show that the last program reports the experimental results whereas the 'ALICE' code does not enable a consistent presentation to be made of all the results by light and heavy ions. Fission does not occur as suddenly as predicted. (Atomindex citation 11:512761)

20I. Plasma Physics

AD-A089 180/4 PC **A03**/MF **A01**
California Univ Los Angeles Plasma Physics Group
Effect of Finite Electron Drift Velocity on the Resonant Excitation of a Nonuniform Plasma,
G. J. Morales, B. M. Lamb, and E. A. Adler. Jul 80, 32p Rept no. PPG-496

Contract N00014-75-C-0476

An exact analytic solution of the external resonant excitation of a nonuniform plasma in the presence of a zero order finite electron drift is presented. The process of linear mode conversion of the long wavelength external radiation, of frequency omega, into a Langmuir wave limits the peak amplitude of the cold plasma resonance at omega = omega sub p, where omega sub p is the local electron plasma frequency. The finite electron drift alters the effective group velocity of the Langmuir wave, and thus it modifies the peak amplitude of the resonance in a significant manner. For drifts toward the overdense side an amplitude enhancement is obtained, while for drifts toward the underdense side a severe quenching takes place. The effect is governed by a single scaled drift parameter, and significant modifications arise when its absolute value is greater than 1.

AD-A089 372/7 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Computer Simulation Studies of the Tearing Mode Instability in a Field-Reversed Ion Layer.
Memorandum rept.,
S. J. Marsh, A. T. Drobot, and C. A. Kapetanakos. 15 Sep 80, 37p Rept no. NRL-MR-4297

Results are reported on the computer simulation of a long, space charge neutral ion layer. The critical axial velocity spread required to stabilize the tearing mode is in agreement with the predictions of Uhm and Davidson. The growth rates of individual modes depend on the evolving profile of the distribution functions. For initially square velocity distribution profile, the code predicts growth rates that are slower by about a factor of two than those of the linear theory. In addition, it has been demonstrated that when the Budker parameter of the layer nu exceeds 1/3, a conducting wall surrounding the layer may have a destabilizing influence on it. (Author)

AD-A089 672/0 PC **A04**/MF **A01**
Naval Research Lab Washington DC
Beam Generated Vorticity and Convective Channel Mixing.
Memorandum rept.,
J. P. Boris, and J. M. Picone. 17 Sep 80, 53p Rept no. NRL-MR-4327

Asymmetries in density and pressure gradients exist when a beam deposits energy off center in a hot gaseous channel formed by a previous beam or discharge. These asymmetries, coupled with the natural dynamics of the expanding compound channel, cause vortex filaments to be generated which propagate unabated long after motion would have ceased in a symmetric flow. This concentrated vorticity is a source of convective (turbulent) cooling of the hot channels. In this paper we present a theory for the amount of vorticity generated as a function of asymmetry and system parameters and calibrate this theory using detailed numerical simulations. An estimate of the convective mixing time for such composite channeis is constructed using the strength of the asymmetry-generated vortex filaments as a source term. (Author)

N80-32224/1 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
A Measurement of Deuterium Neutral by the Balmer-Series in the STP-2 High beta Screw Pinch Tokamak.
S. Yamaguchi, and K. Hirano. Jun 80, 23p IPPJ-471

The Balmer-alpha and beta are measured with a calibrated spectrograph in STP-2 screw pinch Tokamak operated under the maximum toroidal field being 9.2 kg, peak plasma current 30 kA and filling pressure 5 mtorr. The electron temperature and density profiles are obtained by ruby laser Thomson scattering. It is shown that electron temperature is about 10 eV and density is of the order 10 to the 14th power cu cm. A non-cylindrical symmetric Abel-inversion technique was used to deduce the emission coefficient profiles from that of the line intensity of the Balmer's. The collisional radiative model is applied to the rate equations to estimate the ground state population density. It is found that at 4 micron sec from the start of the discharge the deuterium neutral density may be approximately 2 x10 to 12 the power cu cm at the center of plasma and 2 x 10 to the 14th power cu cm at the periphery. These values may contain an error of about factor two. Time history of neutral deuterium density is consistent with the increase of plasma density.

N80-32242/3 PC **A02**/MF **A01**
Research Inst. of National Defence, Stockholm (Sweden).
Relaxation of Charged Particles Injected into a Hot Plasma.
N. Hoernquist. Mar 80, 19p FOA-C-20342-A2

Relaxation ranges and times of charged particles injected into a hot plasma are derived and compared with classical theory. Distant collisions as well as a more vigorous expression for close collisions are taken into account, revealing a significant difference for ion-ion relaxation. By using Bethe's formula for the stopping power of an energetic particle injected into a solid and redefining the ionization potential into a 'plasma potential' by dimensional arguments, an expression for the plasma case is derived and shown to be in qualitative accord with the rigorous expression for relaxation.

N80-32243/1 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Saint-Medard-en-Jalles (France).
Current Operation and Future Uses of High Power Plasma Generators Exploitation Actuelle et Perspectives d'Utilisation des Generateurs de Plasma de Grande Puissance.
M. Labrot. 1980, 16p SNIAS-801-430-104
Text in French. Presented at Journees d'Etudes sur l'Electrothermie Facteur de Mutation et de Develop. Ind., Versailles, France, 6-7 Mar. 1980.

A plasma generator was built to simulate the conditions associated with the reentry of space vehicles into the atmosphere. Its configuration is given together with the attainable performance. The different types of captor used to measure the various related parameters are exposed together with a brief analysis of the basic laws governing the phenomena taking place. The results of one year of operation are given. Certain industrial applications such as thermal drilling are envisaged.

20J. Quantum Theory

AD-A089 481/6 PC **A02**/MF **A01**
Wisconsin Univ-Madison Theoretical Chemistry Inst
Similarity of Wigner's Delay Time to the Virial Theorem for Scattering by a Central Field,
Joseph O. Hirschfelder. 22 Nov 78, 2p AFOSR-TR-80-0773
Grant AFOSR-75-2850
Pub. in Physical Review A, v19 n6 p2463 Jun 79.

No abstract available.

20K. Solid Mechanics

AD-A089 257/0 Not available NTIS
Naval Research Lab Washington DC Shock and Vibration Information Center
The Shock and Vibration Digest, Volume 12, Number 9,
Judith Nagle-Eshleman. Sep 80, 93p
See also Volume 12, Number 7, AD-A087 855.
Availability: Naval Research Lab., Attn: Code 5804. Washington, DC 20375. Annual Rate $100.00 (No copies furnished by DTIC).

Contents: Vibration in Jet Engines; Squeeze-Film Damping of Rotordynamic Systems; Pneumatic Shock Absorbers and Isolators; and Abstracts.

AD-A089 390/9 PC **A03**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
The Stress-Wave Radiation from Growing Cracks.
Materials rept.,
L. R. F. Rose. Aug 79, 26p Rept no. ARL/MAT-112

Explicit formulae are given for the stress discontinuities radiated by a suddenly starting two-dimensional crack under tension, in an ideal elastic body. These formulae also give, with a change in sign, the stress discontinuities radiated by a suddenly stopping crack, and, with a geometrical deformation, those radiated by a three-dimensional crack. The stress in the primary radiation due to short crack-jumps is thus shown to vary in essentially the same manner as does the crack speed during the jump. The diffraction of the primary radiation from one tip of a centre-crack by the other tip produces a secondary radiation, whose properties depend mainly on the nature of the surface wave associated with the primary radiation. Since this first diffraction can lead to crack extension, further diffractions would be difficult to study analytically. If it is possible to isolate the primary radiation experimentally, however, it should give directly the essential characteristics of the source. This could be used to separate source-characteristics from specimen and transducer effects in acoustic emission studies of fatigue cracking, or stress-corrosion cracking. (Author)

AD-A089 647/2 PC **A02**/MF **A01**
Army Armament Research and Development Command Watervliet NY Large Caliber Weapon Systems Lab
Generalized Plane-Strain Problems in an Elastic-Plastic Thick-Walled Cylinder.
Technical rept.
P. C. T. Chen. Jul 80, 22p ARLCB-TR-80028, AD-E440 087
Presented at the Conference of Army Mathematicians (26th), 10-12 Jun 80, Hanover, NH.

A new finite-difference approach has been developed for solving the generalized plane-strain problems of partially-plastic thick-walled cylinders made of strain-hardening or ideally-plastic materials. The tube is assumed to obey the Von Mises' criterion, the Prandtl-Reuss flow theory and the isotropic-hardening rule. The forces include internal pressure, external pressure, and end force. An incremental approach is used and no iteration is needed for each increment. The approach is simpler than others yet quite general and accurate. The desired accuracy can be achieved by reducing the grid sizes and load increments. Some numerical results for the stresses and displacements in partially-plastic thick-walled cylinders with either open-end or closed-end conditions are presented. (Author)

AD-A089 670/4 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Energy Criteria for Finite Hyperelasticity.
Technical summary rept.,
Reza Malek-Madani. Jul 80, 24p Rept no. MRC-TSR-2097
Contracts DAAG29-80-C-0041, DAAG29-75-C-0024
Sponsored in part by NSF-MCS78-09525.

The equations of hyperelasticity have the special feature that their natural entropy is not a globally convex function. Strict convexity of the entropy function is essential in formulating a physically reasonable entropy criterion for shock waves. In this paper we show that the natural entropy of the equations of hyperelasticity is uniformly convex when restricted to the shock curves. This fact enables us to prove the equivalence of the entropy criterion and Lax's shock conditions for existence of weak shocks for problems that are genuinely nonlinear. Furthermore, for problems that are not necessarily genuinely nonlinear we study the (generalized) 'E-condition' and show that it is indeed a generalization of the entropy condition. Finally, we consider the viscosity criterion which requires that a motion of a hyperelastic body is the limit of smooth motions of a family of viscoelastic materials. The relationship between the energy criterion, the E-condition, and the viscosity criterion is then discussed. (Author)

N80-31818/1 PC **A03**/MF **A01**
Technion - Israel Inst. of Tech., Haifa. Dept. of Aeronautical Engineering.

Further Experimental Studies on Vibrations and Buckling of Eccentrically Loaded Stiffened Cylindrical Shells.
J. Singer, and Y. Segal. Dec 78, 46p TAE-331

A method for detection of load eccentricity of stringer-cylindrical shells from vibration tests developed earlier was applied to shells with prescribed load eccentricity. Seven shells with outward or zero load eccentricity were tested and analyzed. In the tests, the shells were vibrated at different load levels and finally buckled. The experimental and theoretical results verify the methods of load eccentricity identification and buckling load prediction and extend their applicablity.

N80-31842/1 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Structs. and Materials Div.
Mathematical Formulation of Damping for Structural Response Analysis.
H. H. Ottens. 27 Feb 79, 12p NLR-MP-79010-U
Presented at AGARD Specialist Meeting on Damping Effects in Aerospace Struct., Williamsburg, VA., 1-6 Apr. 1979.

A survey is presented of damping models that are commonly used in structural response analysis of aerospace structures. The models are evaluated with respect to the required knowledge of structural damping, the mathematical complexity, and the accuracy of the calculated response. The survey is limited to linear damping models and special attention was given to models which represent lightly damped structures.

N80-31843/9 PC **A04**/MF **A01**
Aeronautical Research Inst. of Sweden, Stockholm. Structures Dept.
Analysis of Axially Loaded Stringer Stiffened Circular Cylinders.
A. Samuelson, and P. Vestergren. 1979, 64p FFA-TN-HU-2134
Contract FMV-F-FL-82223-78-002-21-001

The available methods of analysis for the different possible modes of buckling of circular cylinders are summarized. It is concluded that densely stiffened cylinders behave in a way similar to that of an unstiffened shell and the methods of analysis available yield resonably good agreement with test results. In sparsely stiffened cylinders the lower buckling load is governed by the behavior of the shell plate between the stiffeners. Recommendations for design calculations of different types of stiffened cylinders are given.

N80-31844/7 PC **A05**/MF **A01**
Aeronautical Research Inst. of Sweden, Stockholm. Structures Dept.
Buckling of Cylinders with Longitudinal Stiffeners Subjected to Axial Compression.
Final Report. M.S. Thesis - Royal Inst. of Technology, Stockholm.
H. Groth. 1979, 90p FFA-TN-HU-2184
Contract FMV-F-FL-82223-78-174-21-001

The cylinders were designed to buckle in the local buckling region in accordance with the theory for curved panels. This theory was supposed to give the best agreement with test results, but theories for plane plates were also compared to the test results. Eight, twelve, and twenty stringers were used and the end fixtures simulated nearly clamped elastic boundary conditions. The stringers could be considered as heavy. The specimens were not geometrically perfect. The purpose of the tests was to examine the buckling behavior of sparsely stringer stiffened cylinders manufactured with regular workshop tolerances. It was found that most of the available theories are suitable only for the unstiffened cylinder or the general instability cylinders. The only theory that is found for sparsely stiffened cylinders seems to be column theory, which gives an overly conservative design since the influence from the shell is not taken into account.

N80-31849/6 PC **A04**/MF **A01**
Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
Theory and Calculation of Vibrating Structures.
R. Valid. 1980, 58p ONERA-P-1980-1
Text in French; English Summary. Report Will Also Be Announced as Translation (Esa-TT-663). Presented at Cea/Edf Conf. On Vibrations des Struct. Dans le Domaine Ind., Jouy-en-Josas, France, 15-19 Oct. 1979.

Finite element methods, linear vibration theory and the calculation of geometrically nonlinear structures are covered. Finite element methods are developed in a simple manner from the displacement method. Details are given about the most commonly used elements. The theory of linear vibrations is treated for the discrete case. Its variational properties are, however, recalled for both discrete and continuous cases. Formulas describing the response to various excitations (transient, harmonic, periodic, and random) are given. Variational form methods for calculating structures with geometrical nonlinearities are presented together with the algorithms most commonly used for arbitrary excitations. The stability of dynamic systems is introduced.

PB81-106445 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Ivanov's Yield Criterion for Thin Plates and Shells Using Finite Elements,
M. A. Crisfield. c1979, 26p TRRL-LR-919

Both Ivanov's yield criterion and a modification are incorporated in a nonlinear finite element program for the analysis of imperfect thin steel plates. The computer program is applied to the collapse analysis of imperfect steel plates subject to uniaxial compression. The results obtained with the modified Ivanov yield criterion are shown to be in good agreement with solutions obtained using a 'volume integration' with von Mises's yield criterion. They are significantly superior to results previously obtained using either Ilyushin's approximate yield criterion or a modification to that yield criterion. (Copyright (c) Crown Copyright 1979.)

20L. Solid-State Physics

AD-A089 228/1 Not available NTIS
State Univ of New York At Albany Dept of Physics
A Transient Capacitance Study of Radiation-Induced Defects in Aluminum-Doped Silicon,
Y. H. Lee, K. L. Wang, A. Jaworowski, P. M. Mooney, and L. J. Cheng. 19 Nov 79, 9p
Contract N00014-75-C-0919
Availability: Pub. in Physica Status Solidi (a) v57 p697-704 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A089 231/5 PC **A02**/MF **A01**
Princeton Univ NJ Dept of Electrical Engineering and Computer Science
Dynamical Analysis of Low-Energy-Electron-Diffraction Intensities from InSb(110).
Technical rept.,
R. J. Meyer, C. B. Duke, A. Paton, J. L. Yeh, and J. C. Tsang. 30 Jul 79, 13p Rept no. TR-62
Contract N00014-75-C-0394, Grant DAAG29-77-G-0116
Pub. in Physical Review B, v21 n10 p4740-4750, 15 May 80. Sponsored in part by Grant NSF-ENG75-18529.

No abstract available.

AD-A089 238/0 PC **A02**/MF **A01**
Brown Univ Providence RI Dept of Chemistry
Photoelectronic Properties of Ternary Niobium Oxides.
Technical rept.,
K. Dwight, and Aaron Wold. 1 Sep 80, 21p Rept no. TR-12
Contract N00014-77-C-0387

A series of ternary niobium oxides were prepared and their photoelectronic properties evaluated. When two species of photoactive centers are simultaneously present, the higher flat-band potential appears to dominate. But it is evident that both species contribute their characteristic sets of interband transitions to the ensemble. In this respect, these oxide semiconductors behave differently than the conventional, broad-band semiconductors. It would appear that different photoactive centers remain at least partially independent. Hence, for FeNbO4, the data show all the characteristics of the (NbO6) octahedra in addition to all the characteristics of the (FeO6) centers.

AD-A089 468/3 PC **A02**/MF **A01**
Cornell Univ Ithaca NY Baker Lab
Solid State Studies of Hafnium-Selenide-Telurides,
David Hodul, and M. J. Sienko. 1979, 7p AFOSR-TR-80-0816
Grant AFOSR-74-2583
Pub. in Physica, v99 nos1-4 p215-218 Jan 80.

No abstract available.

AD-A089 472/5 PC **A02**/MF **A01**
California Univ Irvine Dept of Physics
Photon Emission from Slightly Roughened Tunnel Junctions,
Bernardo Laks, and D. L. Mills. 19 Jul 79, 20p AFOSR-TR-80-0826
Contract F49620-78-C-0019
Pub. in Physical Review B, v20 n12 p4962-4980 15 Dec 79.

No abstract available.

AD-A089 480/8 PC **A02**/MF **A01**
Rensselaer Polytechnic Inst Troy NY Dept of Electrical and Systems Engineering
Nondestructive Evaluation of Si Wafers Using SAW,
P. Das, M. K. Roy, R. T. Webster, and K. Varahramyan. 1979, 8p AFOSR-TR-80-0828
Contract N00014-75-C-0772, Grant AFOSR-77-3426
Pub. in Ultrasonics Symposium Proceedings, p278-283 Sep 79.

No abstract available.

AD-A089 506/0 PC **A02**/MF **A01**
Stanford Univ CA Edward L Ginzton Lab of Physics
Attenuation of Magnetic Interactions in Amorphous Metals,
S. J. Poon. 16 Apr 79, 5p AFOSR-TR-80-0815
Contract F49620-78-C-0009
Pub. in Physical Review B, v21 n1 p343-346, 1 Jan 80.

No abstract available.

AD-A089 520/1 PC **A07**/MF **A01**
Harvard Univ Cambridge MA Div of Applied Sciences
Nonequilibrium Superconductivity in Optically Illuminated Tunnel Junctions.
Technical rept.,
Andrew D. Smith. Aug 80, 139p Rept no. TR-17
Contracts N00014-77-C-0085, N00014-75-C-0648
Sponsored in part by Grant NSF-DMR79-04155.

In the first chapters, the question of what nonequilibrium quasiparticle energy distribution results from optical illumination on a thin film is addressed. A new technique using tunneling current-voltage characteristics is developed which accurately measures the nonequilibrium quasiparticle occupation function, f(E). The extremely good resolution of this technique is sufficient to compare the experimental situation to contrasting theoretical models of raised temperature (T*) and shifted electro-chemical potential (mu*). Data taken on the Al-PbBi tunnel junctions illuminated for this study are well described by the T* model. Study of illuminated tunnel junctions lead to the discovery of a new thermoelectric effect for tunneling through oxide barriers between metals at different temperatures. The final chapters are devoted to examination of this thermoelectric effect. Two types of experiments were performed to test for the existence of this effect, with positive results. A self-consistent Rothwarf-Taylor model is presented which correctly predicts the sign, magnitude, temperature dependence and laser-power dependence of the thermoelectric current. The thermoelectric effect described here appears to resolve long-standing discrepancies between experimental results and theoretical predictions for a series of point contact experiments. (Author)

AD-A089 545/8 PC **A02**/MF **A01**
California Inst of Tech Pasadena Dept of Applied Physics
Quantitative Calculation of Electro-Optic Coefficients of Diatomic Crystals,
Chun-Ching Shih, and Amnon Yariv. 19 Sep 79, 5p AFOSR-TR-80-0819
Grant AFOSR-78-3685
Pub. in Physical Review Letters, v44 n4 p281-284, 28 Jan 80.

No abstract available.

PB81-112385 Not available NTIS
National Bureau of Standards, Washington, DC.
Electrocaloric Refrigeration at Cryogenic Temperatures.
Final rept.,
R. Radebaugh, W. N. Lawless, J. D. Siegwarth, and A. J. Morrow. 1980, 7p
Sponsored in part by Department of Defense, Washington, DC.
Pub. in Ferroelectrics 27, p205-211 1980.

Refrigeration using the electrocaloric effect can be produced with no moving parts and thus promises to be highly reliable. This paper reviews the principles and experimental results on electrocaloric refrigeration, particularly in the 4-15K temperature range. Many electrocaloric materials were studied but none was found with a sufficiently large reversible electrocaloric effect for a practical refrigerator. The largest effects were seen in a SrTi03 ceramic, followed by a KTa03 single crystal. Temperature reductions of about 0.3K at 10K were observed during depolarization from fields of 20 kV/cm. A theoretical model based on the lattice dynamics of displacive dielectrics is postulated to explain the observed temperature change in such materials.

TU-Inf-05-13-79 PC **A02**/MF **A01**
Technische Univ., Dresden (German D.R.). Sektion Physik.
Comparison of Thermoluminescence Properties of Various Diffenrently Prepared TL Phosphors.
S. Vizoso, K. Prokert, and K. Huebner. May 79, 15p
U.S. Sales Only.

For the comparision of TL detectors prepared by various producers especially the sensitivity must be known. It was determined for some LiF- and Li sub 2 B sub 4 O sub 7 -phosphors as well as for CaSO sub 4 and CaF sub 2 . The sensitivity is given as the ratio of detector reading and particle fluence after exp 60 Co gamma and thermal neutron irradiation. Furthermore, the glow curves after gamma and thermal neutron irradiation are compared. From these curves the activation energies and frequency factors were determined with the help of different calculation methods. (Atomindex citation 11:511458)

20M. Thermodynamics

AD-A089 634/0 PC **A05**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Nonlinear Volterra Equations for Heat Flow in Materials with Memory.
Technical summary rept.,
John A. Nohel. May 80, 97p Rept no. MRC-TSR-2081
Contracts DAAG29-75-C-0024, DAAG29-80-C-0041

Consider the nonlinear Volterra equation u(t) + (b*Au) not an element of f(t). This paper discusses existing and recent results for the following problems concerning this equation the global existence and uniqueness of solutions and their continuous dependence on the data; the boundedness and asymptotic behavior as t approaches infinity in th special cases when X = H is a real Hilbert space and A is either a maximal monotone operator on H or A is a subdifferential of a proper, convex, lower semicontinuous function; and the existence, boundedness, and asymptotic behavior of positive solutions in the general settting. The theory is used to study one possible model problem for heat flow in a material with 'memory' which can be transformed to the equivalent from of the equation under physically reasonable assumptions; the latter provide a motivation for the natural setting of much of the theory developed here.

AD-A089 638/1 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
A Pseudo-Parabolic Variational Inequality and Stefan Problem.
Technical summary rept.,
E. DiBenedetto, and R. E. Showalter. Aug 80, 26p Rept no. MRC-TSR-2100
Contract DAAG29-80-C-0041

We study existence and uniqueness questions concerning non-linear variational inequalities of the type of (1.1a) - (1.1b) in the introduction. Applications to free boundary problems are also given. (Author)

AD-A089 640/7 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Convergence of Nonlinear Elliptic Operators and Application to a Quasi Variational Inequality.
Technical summary rept.,
Maria Giovanna Garroni, and Jean-Pierre Gossez. May 80, 31p Rept no. MRC-TSR-2083
Contracts DAAG29-75-C-0024, DAAG29-80-C-0041

Closedness and compactness results are given for a sequence of nonlinear elliptic operators with monotone type assumptions. These results are then used in the second part to derive existence theorems for a quasi variational inequality related to some questions from nonlinear heat flow. This quasi variational inequality involves a second order operator as above and an implicit obstacle of the Signorini type on the boundary.

AD-A089 665/4 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
On a Semi-Coercive Quasi-Variational Inequality.
Technical summary rept.,
Maria Giovanna Garroni, and Jean-Pierre Gossez. Jun 80, 12p Rept no. MRC-TSR-2092
Contract DAAG29-80-C-0041

One feature of the so-called quasi-variational problems is that the constraints are not given in advance. The problem considered in this paper is related to the description of a stationary temperature distribution inside a material with thermally semipermeable boundary (here are the constraints) in the case where the exterior temperature varies proportionally to some average of the heat flux crossing the boundary (here is the dependence of the constraints on the solution). Some existence results were obtained in a previous work by the authors, assuming that the heat balance equation is coercive, a condition which eventually yields solutions for any forcing term. Here we deal with a weakened form of this condition, the semi-coercive case, which, in some respects, is physically more natural. A sufficient and almost necessary condition on the forcing term is obtained for the existence of solutions.

20N. Wave Propagation

AD-A089 412/1 PC **A06**/MF **A01**
Georgia Inst of Tech Atlanta Engineering Experiment Station
Analysis and Measurements of Three-Dimensional Arbitrarily-Shaped Dielectric Scatterers.
Interim rept. 1 Sep 78-31 Jan 80,
J. J. H. Wang, and C. Papanicolopulos. May 80, 101p RADC-TR-80-167
Contract F19628-78-C-0223

Theoretical and experimental research was conducted to determine the electromagnetic scattering from heterogeneous dielectric bodies. The discrepancies in the literature regarding the singularity of the electric dyadic Green's functions were resolved. Compact range scattering measurements at 1 GHz were successfully performed. Extensive computations were made for a variety of dielectric scatterers, including a one-foot bird at 1 GHz. The agreements between measurements and computation were good except for the resonant sphere, for which the calculated resonant frequencies were shifted by about 20 percent. Various numerical techniques, to treat symmetrical scatterers, using symmetric matrices, banded matrices, and virtual memory were implemented in the Volume Integral Equation algorithm. (Author)

AD-A089 547/4 PC **A02**/MF **A01**
Arizona Univ Tucson Plasma Lab
Absorption of Energy from a Large Amplitude Electromagnetic Pulse by a Collisionless Plasma.
robert N. Carlile, Alexander Cavalli, William L. Cramer, Richard M. Hyde, Jr., and William A. Seidler. 12 May 78, 10p AFOSR-TR-80-0761
Grant AFOSR-76-2949
Pub. in IEEE Transactions on Antennas and Propagation, vAP-27 n5 p596-603 Sep 79.

No abstract available.

AD-A089 574/8 PC **A02**/MF **A01**
MARK Resources Inc Marina Del Rey CA
Helicopter Blade Modulation Model (REVISED).
Technical note,
R. L. Mitchell. 29 Mar 78, 4p Rept nos. MRI-149-16, MRI-TN-105-040
Contract DAAK40-78-C-0031
Revision of Rept. no. MRI-149-12.

Two basic helicopter blade modulation models were described in Reference 1. One was based on scattering from the blade tips and the other was based on the specular flash. Evidence presented in Reference 2 supports the latter model.

AD-A089 575/5 PC **A02**/MF **A01**
MARK Resources Inc Marina Del Rey CA
Fortran Program for Helicopter Blade Modulation Signal.
Technical note,
R. L. Mitchell. 22 May 78, 12p Rept nos. MRI-149-19, MRI-TN-105-042
Contract DAAK40-78-C-0031

The modulation signal for the rotating helicopter blade is derived in Reference 1. Two basic models were proposed in this reference: a model based on scattering from the blade tip and a specular flash model. Evidence presented in Reference 2 is somewhat inconclusive, although the statement is made that 'most of the echo is derived from the outer portions of the rotor blade (approximately the outer 20% of the blade length)'. Such a statement supports the model where scattering is assumed to occur at the blade tip. (Author)

AD-A089 577/1 PC **A02**/MF **A01**
MARK Resources Inc Marina Del Rey CA
Spectrograms Derived from Helicopter Blade Modulation Program.
Technical note,
R. L. Mitchell. 9 Jun 78, 7p Rept nos. MRI-149-22, MRI-TN-105-044
Contract DAAK40-78-C-0031

A spectrogram is the output of a bank of filters (e.g., an FFT) as a function of time. It can be plotted as a 3-D surface, amplitude or power vs. frequency and time. The helicopter blade modulation signal as modeled in MRI-149-19 (and as simulated with the Fortran program) was used to create several spectrograms. (Author)

AD-A089 649/8 PC **A05**/MF **A01**
R and D Associates Marina Del Rey CA
Electromagnetic Scattering by an Object Embedded in a Stratified Medium.
Final rept.,
Maurice I. Sancer, Scott Siegel, and Dennis S. Goodrow. Aug 80, 94p RDA-TR-110400-002, AFWL-TR-80-30, AD-E200 557
Contract F29601-78-C-0098

A general electromagnetic scattering formulation is presented for the situation in which a perfectly conducting body is embedded in a horizontally or

radially stratified medium. The electric field integro-differential equation (EFIDE) and magnetic field integral equation (MFIE) are derived for the determination of the surface current density induced on the body by a general class of sources. Expressions are also presented for the use of the current density to determine the electric and magnetic fields scattered by the body into any layer of the medium. Detailed expressions for the MFIE and EFIDE are presented for the horizontally stratified two-layered medium configuration corresponding to the object being in a vacuum half-space above a lossy half-space. A computer code, which is an extended version of NEC-2A, is developed for the solution of the two-layer MFIE for a situation where the object is a model of an aircraft. Results corresponding to special cases obtained by this computer code are compared to experimental data as well as to numerical results obtained by another independently developed computer code.

N80-31709/2 PC **A03**/MF**A01**E
Centre National d'Etudes Spatiales, Toulouse (France).
Residual Error of Dual-Frequency Spatial Radio Tracking Systems Due to the Ionosphere Erreur Ionospherique Residuelle dans les Systemes de Radiolocalisation Spatiale Bi-frequences.
J. Saint-etienne. Jan 80, 48p CNES-NT-93
Text in French; English Summary. Presented at Cnexo Colloq., Brest, France 1-5 Oct. 1979.

Errors due to ionospheric interference in navigation and geodetic satellite systems are discussed. The raw error without correction is indicated. The possibility of correction by the use of ionospheric models is briefly considered. More details concerning a method of correction which uses an additional link operating at a frequency well separated from that of the main link, taking into account the dispersive property of the ionosphere, are given. Correction by dual frequency measurement is then formalized. Results are applied to the case of range measurements involving group propagation velocity and to the case of range rate measurements (Doppler effect) involving phase propagation velocity.

N80-31710/0 PC **A04**/MF**A01**E
Centre de Recherches en Physique de l'Environnement Terrestre et Planetaire, Orleans (France). Dept. PCE.
Analysis of Electromagnetic Wave Field from Models with One or Two Privileged Directions Analyse de Champs d'Ondes Electromagnetiques a Partir de Modeles a Une ou Deux Directions Privileges.
L. J. Buchalet. Sep 79, 52p CRPE-NT-76
Text in French. Sponsored in Part by Delegation Gen. A la Rech. Sci. Et Tech. (Dgrst).

A method was developed to analyze the measurements of an electromagnetic wave field in a spatial magnetoplasma. The definition of the wave distribution function is first recalled. The technique is explained for obtaining the spectral matrix (measured without noise). The methods for calculating the parameters are presented. The study was then repeated in the presence of noise and the differences noted. The models with one or two privileged directions are studied. The analysis of real data, from the Omega emitter and collected through a GEOS satellite, is then presented.

N80-31713/4 PC **A03**/MF**A01**E
Fondazione Ugo Bordoni, Rome (Italy).
Applications of the Finite Element Method to the Calculation of Electromagnetic Fields in Cylindrical Structures Applicazione Del Metodo Degli Elementi Finiti al Calcolo Del Campo Elettromagnetico in Structture Cilindriche.
E. Carli, T. Corzani, L. Mania, and E. Valentinuzzi. Mar 79, 49p FUB-2-1979
Text in Italian.

The finite element method is adapted to open structures where surface waves can propagate. Applications are considered in conventional areas such as microwave circuits and antenna or less conventional subjects such as traffic control. The proposed computer program is described and numerical results are given. The computer memory requirements and the limitations regarding surface wave applications are discussed.

N80-31722/5 PC **A03**/MF**A01**E
Fondazione Ugo Bordoni, Rome (Italy).
Influence of the Space Structure and Physical Properties of Rain on the Evaluation of the Anisotropy and Depolarizing Properties Influenza Della Struttura Spaziale E Delle Proprieta' Fisiche Delle Precipitationi Sufla Valutazione Della Anisoptropia E Della Proprieta's Depolarizzanti.
D. Maggiori, and A. Paraboni. Dec 79, 37p FUB-22-1979
Text in Italian.

The anisotropy and polarization of centimeter waves propagating through rain was studied as a function of meteorological parameters such as the drop diameter distribution, the drop temperature, the rain intensity profile through the wave path, and the distribution of the axial ellipsoidal drop symmetry orientation. A block diagram of the computer program for the determination of the joint probability density function of the attenuation and anisotropy is presented with numerical example. The effects of the parameters under discussion are discussed.

N80-32036/9 PC **A03**/MF **A01**
Fondazione Ugo Bordoni, Rome (Italy).
A Study on Algorithms and Processing Programs for Data from Interference Due to Hydrometeors at 17.8 Ghz Studi Degli Algoritmi E Dei Programmi di Elaborazione Dei Data di Interferenza Dovuta a Idrometeore a 17.8 Ghz.
A. Paraboni. Sep 79, 47p FUB-12-1979
Text in Italian.

Rain interference studies related to a future Sirio satellite experiment are presented. The physical characteristics of the parameters to be measured are examined. The measuring system characteristics are related to the experiment objectives. The data processing techniques to assure optimal use of existing infrastructure are discussed.

N80-32037/7 PC **A03**/MF **A01**
Fondazione Ugo Bordoni, Rome (Italy).
Characterization and Influence of the Parameters of a Model to Describe Hydrometeor Diffusion Individuazione Ed Influenza Dei Parametri di UN Modello Atto a Caratterizzare I Fenomi di Diffusione DA Idrometeore.
A. Paraboni. Sep 79, 32p FUB-23-1979
Text in Italian.

A structural model of hydrometeor electromagnetic radiation diffusion is presented referred to centimeter and millimeter wavelengths and to satellite-ground transmissions. Two approaches to the probalistic prevision of scattering coupling, one taking into consideration the Misme-Fimbel storm cell model, and the other considering a stratified structure only, are discussed.

21.

PROPULSION AND FUELS

21B. Combustion and Ignition

AD-A089 295/0 MF **A01**
National Bureau of Standards Washington DC National Engineering Lab
Ignition of a Liquid Fuel under High Intensity Radiation.
Final progress rept. 1 May 78-30 Sep 79,
Takashi Kashiwagi, Howard R. Baum, and John A. Rockett. Jan 80, 68p AFOSR-TR-80-0476
Grant AFOSR-ISSA-79-0006
Availability: Microfiche copies only.

This report summarizes progress in the study of ignition of a liquid fuel under high intensity radiation. It describes an experimental study of the key processes during ignition and a theoretical modeling study of part of the phenomena during the ignition period. The experiments were conducted using a CW CO2 laser with incident fluxes from 1000 to 5000 W/sq cm and n-decane as the flammable liquid. High speed photographs of ignition events showed a periodic depression in the decane surface, probably caused by the thrust of the strong decane vapor flux; radial outward motion of the liquid, probably caused by a surface tension, gradient was also observed. The first appearance flame was in the gas phase well above the surface. The proposed autoignition mechanism of decane by the CO2 laser is the absorption of the incident laser beam by the vapor plume. The effect on ignition of the incident angle of the laser beam with respect to the decane surface was studied from 90 to 30 degrees. On reducing the incident angle, the ignition delay time becomes longer and the minimum incident flux for ignition increases significantly. A theoretical model describing the flow motion in the gas phase caused by a heated surface was calculated numerically and solved analytically. (Author)

AD-A089 375/0 PC **A08**/MF **A01**
Florida Univ Gainesville Dept of Chemistry
Temporal and Spatial Temperature Measurements of Combustion Flames.
Final rept. 1 Jun 79-29 Feb 80,
James D. Winefordner. 21 May 80, 165p
AFWAL-TR-80-2045
Contract F33615-78-C-2038

Five methods have been developed theoretically from steady state rate theory and four have been verified experimentally for the measurement of spatial flame temperatures. All of the methods have potential use on a 'single' pulse (time period less than 1 micron) basis for the measurements of flame temperatures. All of the methods involve the use of one or two closely spaced (in time) dye laser pulses to excited atomic fluorescence of probe atoms (e.g., T1, In, Ga, etc.) introduced as an aerosol into the flames. Several experimental difficulties have resulted in initial barriers to the measurement of flame temperatures in hydrocarbon flames as well as the use of an available SIT detector for height profiles of flame temperatures. Other studies have included the theoretical development nad experimental implementation of absolute concentration measurements of atom probes in flame as well as study of saturation broadening of atomic lines. (Author)

N80-31519/5 PC **A02**/MF**A01**E
Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
A Prediction Model for Turbulent Diffusion Flames, Including No-Formation.
J. Janicka, and W. Kollmann. Sep 79, 17p VKI-PREPRINT-1979-14
Submitted for Publication. Presented at AGARD-PEP 54TH Specialists' Meeting on Combustor Modeling, Cologne, 3-5 Oct. 1979.

A prediction model for turbulent diffusion flames burning gaseous fuels was developed and applied to H2-air flames. In the simplified system of chemical reactions the fast reactions are assumed to be in equilibrium whereas three-body recombinations are treated in nonequilibrium. For the H2-air flames this assumption leads to a description of the reacting system with only two variables: reaction fraction and reaction variable. Two methods of treating such a system in a turbulent flow are discussed. Two sets of equations are complemented with a modified version of the kinetic energy/dissipation rate turbulence model. The NO-formation in such flames can be calculated using the nonequilibrium values (mean values and covariances) of the O and H radicals. The results obtained with both models are compared with experiments and show good agreement.

21C. Electric Propulsion

AD-A089 526/8 PC **A09**/MF **A01**
Royal Aircraft Establishment Farnborough (England)
Solar Power Satellites - A Review of the Space Transportation Options.
Technical rept.,
D. G. Fearn. Mar 80, 195p RAE-TR-80034, DRIC-BR-74953

Solar power satellites, if developed, could supply a large proportion of the world's future electrical energy requirements in a safe and pollution-free manner. However, such enormous orbiting structures, with masses of up to 100000 tonnes, can only be built and operated if suitable transportation systems are provided. This Report reviews the options available for lifting both heavy payloads and personnel to low earth orbit, and from there to geostationary orbit. It is concluded that conventional launcher technology, using liquid hydrogen/liquid oxygen engines, should be adequate for the former task. The latter can best be accomplished using electric propulsion, with ion thrusters being the most suitable devices, owing to their high efficiency and advanced state of development. Environmental effects of such a transportation system are considered, and it is concluded that they should not prove to be unacceptable. (Author)

21D. Fuels

AD-A089 315/6 PC **A04**/MF **A01**
Florida Univ Gainesville Dept of Zoology
The Dissemination and Combustion of Unconfined Liquefied Natural Gas Clouds.
Final rept. 24 Jul-31 Dec 78.
May 79, 59p Rept no. GC-TR-79-1033
Contract DOT-CG-840700

A series of experimental tests were performed in the field to: (1) explosively disseminate liquefied natural gas (LNG) to form an unconfined cloud of measurable size and shape, (2) transfer a detonation wave from a different chemical cloud, but one known to support detonation, into an LNG cloud, and (3) observe and measure the effects of the transferred detonation wave in the unconfined LNG cloud. Based on the results of these feasibility tests, additional experiments are recommended. A two-cloud detonation transfer technique has been used to study the ability of an unconfined LNG cloud to support detonation. In this technique, two clouds are generated and the LNG cloud serves as the test cloud. The second cloud, the driver cloud, is composed of an easily detonable material and is used to generate the detonation wave. For these tests, propylene oxide was utilized as the driver cloud. A detonator in the driver cloud serves as the initiation source. High speed (about 4000 frames/second) and the medium speed (about 400 frames/second) cameras and pressure transducers served as diagnostics. The absolute radiometric output from the unconfined LNG cloud can be determined since calibration step wedges were used with films from selected cameras.

AD-A089 335/4 PC **A03**/MF **A01**
Energy Analysts Inc Norman OK
Cargo Fire Hazards and Hazard Control for the Supplement Fuel Supply Assembly (SFSA).
Final rept. Jan-Jul 80.
Aug 80, 44p CEL-CR-80.024
Contract N68305-79-C-0021

This study evaluates potential fuel spills, spill fires and fuel spill hazards at a supplemental fuel supply installation. Potential fuel spill sources, probabilities and volumes are calculated. Consequences of these spills assuming spill ignition are quantified. Logistic support, manpower, and training needed to maintain the recommended spill control systems are detailed. (Author)

AD-A089 342/0 PC **A04**/MF **A01**
Federal Aviation Administration Technical Center Atlantic City NJ
Engineering and Development Program Plan, Antimisting Fuel.
Sep 80, 62p FAA-CT-80-162, FAA-ED-18-4

A phased program is identified to direct research and development efforts to: (a) determine if the use of antimisting fuel is feasible; (b) develop recommendations as to its introduction and use in civil aviation operations; and (c) demonstrate its effectiveness in a crash instance, and (d) assess the economic reasonableness in support of regulatory actions. The basic program utilizes an existing high molecular weight polymer additive dissolved in kerosene using a carrier fluid as a representative agent to prove the concept of uses of such fuels. Parallel to this main effort are investigations to identify other potentially acceptable fuels. Estimated funding and proposed scheduling are included. (Author)

AD-A089 451/9 PC **A06**/MF **A01**
AiResearch Mfg Co of Arizona Phoenix
Compound Cycle Turbofan Engine (CCTE). Task IX. Carbon-Slurry Fuel Combustion Evaluation Program.
Final rept. Jun-Sep 79,
T. W. Bruce, and H. Mongia. Mar 80, 101p 21-3365-A, AFWAL-TR-80-2035
Contract F33657-77-C-0391
See also AD-B036 978L.

The carbon-slurry fuel evaluation program demonstrated the feasibility of running a currently available carbon-slurry fuel in a combustion rig and a turbine engine. This program also established the preliminary design criteria for operating on carbon-slurry fuels. Subcontracts work was performed by Pennsylvania State for fuel droplet measurements and by Suntech, Inc. for fuel development and manufacture. (Author)

JPL-PUBL-79-72 PC **A05**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Conference and Workshop on Coal Use for California. Coal Use for California: Problems and Perspectives. Final Report.
M. Goldsmith. 30 Jun 79, 90p
Contract AA01-78ET12276

Coal has not been a major factor in energy supply in California. Both Federal law and policy statements by state leaders indicate that coal will assume an increased role in the future. A conference, with invited papers, was held in May 1978, to review technical, economic, legal and social aspects of the use of coal for California. This was followed by a smaller scale workshop, held in October 1978. Technical and policy issues were identified in those activities, and conference and workshop reports have been prepared. A series of discussions and interviews between JPL staff and policy-oriented individuals were held to clarify issues and to explore possible solutions to problems. This report is a record of the results of this work. (ERA citation 05:031553)

N80-31624/3 PC **A08**/MF **A01**
Air Products and Chemicals, Inc., Allentown, PA.
A Study of Industrial Hydrogen and Syngas Supply Systems.
Final Report.
W. J. Amos, J. Solomon, and K. F. Eliezer. Oct 79, 159p NASA-CR-163523
Contracts NAS7-100, JPL-955421
Prepared for JPL.

The potential and incentives required for supplying hydrogen and syngas feedstocks to the U.S. chemical industry from coal gasification systems were evaluated. Future hydrogen and syngas demand for chemical manufacture was estimated by geographic area and projected economics for hydrogen and syngas manufacture was estimated with geographic area of manufacture and plant size as parameters. Natural gas, oil and coal feedstocks were considered. Problem areas presently affecting the commercial feasibility of coal gasification discussed include the impact of potential process improvements, factors involved in financing coal gasification plants, regulatory barriers affecting coal gasification, coal mining/transportation, air quality regulations, and competitive feedstock pricing barriers. The potential for making coal gasification the least costly H2 and syngas supply option. Options to stimulate coal gasification system development are discussed.

N80-31625/0 PC **A06**/MF **A01**
Westinghouse Electric Corp., Pittsburgh, PA. Advanced Energy Systems Div.
A Study on the Electrolysis of Sulfur Dioxide and Water for the Sulfur Cycle Hydrogen Production Process.
Final Report.
Jul 80, 121p NASA-CR-163517, AESD-TME-3043
Contracts NAS7-100, JPL-955380
Prepared for JPL.

Experimental electrolysis cells using various platinum catayzed carbon electrodes were tested. When operated at 200 mA/sq cm current density using 50 w/o acid at 50 C and 1 atm, a reference cell required 1.22 volts and degraded rapidly. After several improvements were incorporated into electrodes and the test cell configuration, a later cell required only 0.77 volts under identical operating conditions. At a lower current density, 100 mA/sq cm, the cell required only 0.63 volts. Kinetic studies on metal electrodes, measurements of temperature effects on electrode kinetics, investigations of electrocatalytic activities of metal electrodes over a wide range of acid concentrations, cyclic voltametric studies and evaluation of alternate catalysts were also conducted. From diffusivity experiments, a cation exchange membrane material, P-4010, exhibited an excellent diffusion coefficient, more than two orders of magnitude lower than that of rubber. Ionic resistivity measurements of eight materials showed that microporous rubber had the lowest resistivity.

PB81-105546 PC **A08**/MF **A01**
International Maritime Associates, Inc., Washington, DC.
The Development of Waterborne Alcohol Fuel Plants. Volume 1: Final Report.
Rept. for Oct 79-Sep 80,
S. W. Phillips, L. H. Weiss, and M. C. Colen. Sep 80, 167p MA-RD-940-81003-VOL-1
Contract MA79-SAC-00078
See also Volume 2, PB81-105553. Prepared in cooperation with Chem Systems, Inc., New York, and Avondale Shipyards, Inc., New Orleans, LA.
Also available in set of 3 reports PC E13, PB81-105538.

The charter of the project was to review alcohol production processes and feedstock, study their application to floating plant technology and perform case studies that would show the near term potential for these types of plants. The four case studies dealt with production of methanol from natural gas in Cook Inlet, Alaska; methanol from natural gas in Baltimore Canyon, Atlantic Ocean; ethanol and methanol for codisposed refuse and sludge--long range plan for New York City; ethanol from agricultural feedstocks and MSW, State of Louisiana. Two plants were used in design and economic studies--1000 TDP methanol plant and 250 TPD ethanol plant.

PB81-105553 PC **A07**/MF **A01**
International Maritime Associates, Inc., Washington, DC.
The Development of Waterborne Alcohol Fuel Plants. Volume 2: Case Studies.
Final rept. Oct 79-Sep 80,
S. W. Phillips, L. H. Weiss, and M. C. Colen. Sep 80, 148p MA-RD-940-81003-VOL-2
Contract MA79-SAC-00078
See also Volume 1, PB81-105546 and Volume 3, PB81-105561. Prepared in cooperation with Chem Systems, Inc., New York, and Avondale Shipyards, Inc., New Orleans, LA.
Also available in set of 3 reports PC E13, PB81-105538.

The charter of the project was to review alcohol production processes and feedstock, study their application to floating plant technology and perform case studies that would show the near term potential for these types of plants. The four case studies dealt with production of methanol from natural gas in Cook Inlet, Alaska; methanol from natural gas in Baltimore Canyon, Atlantic Ocean; ethanol and methanol from codisposed refuse and sludge--long range plan for New York City; ethanol from agricultural feedstocks and MSW, State of Louisiana. Two plants were used in design and economic studies--1000 TPD methanol plant and 250 TPD ethanol plant.

PB81-105561 PC **A04**/MF **A01**
International Maritime Associates, Inc., Washington, DC.
The Development of Waterborne Alcohol Fuel Plants. Volume 3: Summary of Findings/Presentation.
Final rept. Oct 79-Sep 80,
S. W. Phillips, L. H. Weiss, and M. C. Colen. Sep 80, 60p MA-RD-940-81003-VOL-3
Contract MA79-SAC-00078
See also Volume 2, PB81-105553. Prepared in cooperation with Chem Systems, Inc., New York, and Avondale Shipyards, Inc., New Orleans, LA.
Also available in set of 3 reports PC E13, PB81-105538.

The charter of the project was to review alcohol production processes and feedback, study their application to floating plant technology and perform case studies that would show the near term potential for these types of plants. The four case studies dealt with production of methanol from natural gas in Cook Inlet, Alaska; methanol from natural gas in Baltimore Canyon, Atlantic Ocean; ethanol and methanol from codisposed refuse and sludge--long range plan for New York City; ethanol from agricultural feedstocks and MSW, State of Louisiana. Two plants were used in design and economic studies--1000 TDP methanol plant and 250 TPD ethanol plant. This document provides highlights of the first two volumes and copies of presentation material.

PB81-109373 PC **A03**/MF **A01**
National Alcohol Fuels Commission, Washington, DC.
Fuel Alcohol on the Farm: A Primer on Production and Use.
1980, 45p NAFC/80-09
Prepared in cooperation with Energy, Inc., Idaho Falls, ID., and National Center for Appropriate Technology, Butte, MT.

The primer outlines for farmers the major factors to be considered before undertaking the production of ethanol on a small-scale basis - feedstocks, financing, safety, vehicle conversion and permit requirements. It illustrates and describes four small-scale stills that are currently operating.

PB81-110306 PC **A07**/MF **A01**
Institute of Public Administration, Washington, DC.
An Analysis of the Department of Energy's Fuel Allocation Plan and Related Policies.
Final rept.,
Seyoum Solomon, Joseph Revis, David Budin, and James Pawela. Jun 80, 134p
Contract SBA-2631-0A-79

The objective of this research program was to analyze the impact of the Department of Energy's fuel allocation regulations on the economic viability of small gasoline marketers. The first part of the study laid out the theoretical setting (microeconomics) of the fuel allocation regulation and developed the conceptual basis for impact analysis. In order to clearly understand the workings of the allocation regulations and how they affect the industry, a historical and institutional analysis of the gasoline industry was performed.

PB81-110504 PC **A09**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Evaluation of Fresh Kills Landfill Gas for Industrial Applications.
Final rept. Aug 77-Mar 80,
C. Briceland, S. Bortz, M. J. Khinkis, H. Abassi, and R. T. Waibel. Mar 80, 183p NYSERDA-80-1
Prepared in cooperation with Brooklyn Union Gas Co., NY.

This report describes a combined laboratory and field test program carried out at the Fresh Kills Landfill on Staten Island to determine the acceptability of landfill gas as a replacement for natural gas and imported fuels in industrial processes. Landfill gas, created by the natural breakdown of organic materials, is about 50 percent methane. The Fresh Kills gas was tested to gauge its performance, characteristics and heat value, especially in relation to natural gas. The result of the tests were so favorable, that an aggressive program has been initiated statewide to identify landfill sites and potential industrial users for the landfill gas.

PB81-110512 PC **A06**/MF **A01**
Dynecology, Inc., Harrison, NY.
Energy from Biomass: The Simplex Process for the Gasification of Coal and Forest Pulp.
Final rept. Jan 79-Mar 80,
J. C. Arbo, and D. P. Glaser. Apr 80, 103p NYSERDA-80-2

Simplex is a process which simultaneously turns coal and cellulosic materials such as municipal solid wastes, forest pulp and sewage sludge solids into gas. This report summarizes a series of tests performed to investigate the adaptation of the Simplex process to the gasification of forest pulp or wood wastes. A coal and forest pulp briquette formulation, needed for the gasification process, was developed as part of the project. The sample briquettes were successfully turned into gas.

PB81-111106 PC **A11**/MF **A01**
Systems Technology Corp., Xenia, OH.
A Field Test Using Coal:dRDF Blends in Spreader Stoker-Fired Boilers.
Final rept. Jun 76-Jul 78,
Gerald H. Degler, H. Gregory Rigo, and Boyd T. Riley, Jr. Aug 80, 237p EPA-600/2-80-095
Contract EPA-68-03-2426

This program was conducted to characterize and demonstrate the technical, economic, and environmental feasibility of combustion densified forms of refuse derived fuel (dRDF) blended with coal in spreader stoker-fired boilers. A total of 258.5 Mg (285 tons) of pelletized 1/2-inch-diameter x 3/4-inch-long dRDF was co-fired with coal in 2.7 x 7.5 kg/sec (60,000 lb/hr) and 3.6 x 10 kg/sec (75,000 lb/hr) of 1.03 MPa (150 psig) saturated steam. The results indicate that coal:dRDF blends up to 1:2 can be handled and burned in conventional spreader stoker-fired boilers without major equipment modification. As more dRDF was substituted for coal, the flame volume increased, the opacity decreased, the fly ash carbon burnout improved, and the turndown ratio of boiler operation increased. The emissions from the blend firing decreased slightly in mass flux, dropped significantly in particulate size and stack opacity, and had satisfactory particulate resistivities.

PB81-800096 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Alcohol Fuels. 1973-July, 1980 (Citations from the American Petroleum Institute Data Base).
Rept. for 1973-Jul 80,
Diane M. Cavagnaro. Oct 80, 266p
Supersedes NTIS/PS-79/0911.

Research on alcohol fuels are cited. The citations cover synthesis, chemical analysis, performance testing, processing, pollution, economics, environmental effects, and feasibility. (This updated bibliography contains 260 citations, 82 of which are new entries to the previous edition.)

21E. Jet and Gas Turbine Engines

AD-A089 161/4 PC **A05**/MF **A01**
Air Force Wright Aeronautical Labs Wright-Patterson AFB OH
An Evaluation of the Usefulness of Two Math Models for Predicting Performance of a 100 mm Bore, Angular Contact, High Speed, Thrust Bearing.
Final technical rept. May 77-Dec 78,
Dale R. Schulze. Apr 80, 98p Rept no. AFWAL-TR-80-2007

New designs for mainshaft thrust bearings for gas turbine engines are derived from mathematical and experimental analyses. The predictions of two bearing computer models, DREB and SHABERTH, being used by the Aero Propulsion Laboratory, were compared to experimental data generated by this study. This test bearing was a 100 mm bore, angular contact, ball bearing which was designed for R&D. Overall, the SHABERTH model was found to be a more practical tool for preliminary bearing design. However, DREB showed promise of being a valuable tool for diagnosing the dynamics of the bearing cage. This study also presents a new method for measuring three-dimensional kinematics of the bearing cage. A bibliography of the pertinent literature is included. (Author)

AD-A089 182/0 PC **A08**/MF **A01**
General Motors Corp Indianapolis in Detroit Diesel Allison Div
Fuel Character Effects on Current, High Pressure Ratio, Can-Type Turbine Combustion Systems.
Final rept. Jun 78-Jun 79,
Rodney E. Vogel, Dennis L. Troth, and Albert J. Verdouw. Apr 80, 163p DDA-EDR-9762, AFAPL-TR-79-2072, AFESC/ESL-TR-79-29
Contract F33615-78-C-2006

The effect of limited fuel property variation on the performance of current, high pressure-ratio, can-type combustors was evaluated. The TF41 turbofan combustor was employed. This combustor has conventional, dual-orifice fuel injection and film cooling. The combustion zone is approximately stoichiometric at takeoff. Twelve experimental fuels, including JP-4 and JP-8, were tested. Distillation range, hydrogen content, and aromatic type were varied by blending JP-4 and JP-8 fuels with mineral seal oil and two types of aromatic solvents. Performance tests were accomplished at idle, altitude cruise, dash, and takeoff conditions. Sea level and altitude ignition tests were also completed. Fuel fouling and carboning characteristics were established. Combustor operating parameters such as liner temperature, pattern factor, ignition fuel/air ratio, lean blow out fuel/air ratio, and exhaust emissions were correlated to fuel properties. The effect of fuel properties on combustor and turbine hardware durability was assessed analytically. (Author)

AD-A089 279/4 PC **A05**/MF **A01**
General Electric Co Lynn MA Aircraft Engine Group
Maritime Patrol Aircraft Engine Study, General Electric Derivative Engines. Volume III. Appendix B - Performance Data - TF34/T7 Study A1 Turboprop.
Final rept. Oct 78-Apr 79,
R. Hirschkron, R. H. Davis, and R. E. Warren. 30 Apr 79, 81p R79AEG052-VOL-3, NADC-79133-60-VOL-3
Contract N62269-78-C-0414
See also Volume 4, AD-A089 337.

This study developed data on General Electric common core derivative engines for use in Maritime Patrol Aircraft (MPA) concept formulation studies. The study included the screening of potential General Electric turbofan and turboprop/turboshaft engines and the preparation of technical and planning information on three of the most promising engine candidates. Screening of General Electric derivative candidates was performed utilizing an analytical MPA model using synthesized mission profiles to rank the candidates in terms of fuel consumption, weight, cost and complexity. The three turboprop engines selected for further study were as follows: TF34 growth derivative version with boost and new LPT (TF34/T7 Study A1), F404 derivative with booster stages and new LPT (F404/T1 Study A1), and GE27 scaled and boosted study engine (GE27/T3 Study A1). Volume I summarizes the screening analysis and contains technical, planning, installation, cost and development data for the three selected turboprop engines. Volumes II, III and IV of this report contain the detailed performance data estimates for the GE27/T3 Study A1, TF34/T7 Study A1 and F404/T1 Study A1 turboprop engines, respectively. (Author)

AD-A089 326/3 PC **A03**/MF **A01**
Defence Research Establishment Atlantic Dartmouth (Nova Scotia)
Effect of Zinc on the Sulphidation Reaction in Marine Gas Turbines,
Roger S. Hollingshead. Jun 80, 30p Rept no. DREA-80/2
Abstract in French.

One of the major factors controlling the lifetime of marine gas turbines is the rapid degradation of the turbine blades by a process known as sulphidation. In this form of accelerated corrosion attack, the salt ingested with the intake air combines with the sulphur from the fuel and reacts with the blade

alloy at high temperature. However, metallurgical examination of turbine blades from a P&W FT-12 gas turbine showed that no degradation of the blades had occurred after 3500 hours of operation in a DDH 280 class destroyer. Similarly, blades from the Solar Saturn gas turbines were sulphidation free after as many as 11,200 hours of operation although degradation due to other causes was observed. The blade surfaces were partially covered by a white deposit identified as ZnSO4. The source of the Zn is the zinc pigmented protective coating in the fuel tanks. Sulphidation of turbine blades was induced in the laboratory where it was found that in the majority of the tests the blades were completely oxidized after 16 - 90 hrs. However, with the addition of 2.5 or 5 percent ZnSO4 to the 90/10 Na2SO4/NaCl salt mixture, sulphidation was prevented. These results, along with the observation that sulphidation has not occurred in service, suggest that the presence of Zn in the fuel may have prevented the sulphidation process. (Author)

AD-A089 336/2 PC **A05**/MF **A01**
General Electric Co Lynn MA Aircraft Engine Group
maritime Patrol Aircraft Engine Study, General Electric Derivative Engines. Volume II. Appendix A - Performance Data - GE27/T3 Study at Turboprop.
Final rept. Oct 78-Apr 79,
R. Hirschkron, R. H. Davis, and R. E. Warren. 30 Apr 79, 81p R79AEG052-VOL-2, NADC-79133-60-VOL-2
Contract N62269-78-C-0414
See also Volume 3, AD-A089 279.

This study developed data on General Electric common core derivative engines for use in Maritime Patrol Aircraft (MPA) concept formulation studies. The study included the screening of potential General Electric turbofan and turboprop/turboshaft engines and the preparation of technical and planning information on three of the most promising engine candidates. Screening of General Electric derivative candidates was performed utilizing an analytical MPA model using synthesized mission profiles to rank the candidates in terms of fuel consumption, weight, cost and complexity. The three turboprop engines selected for further study were as follows: TF34 growth derivative version with boost and new LPT (TF34/T7 Study A1), F404 derivative with booster stages and new LPT (F404/T1 Study A1), and GE27 scaled and boosted study engine (GE27/T3 Study A1). Volume I summarizes the screening analysis and contains technical, planning, installation, cost and development data for the three selected turboprop engines. Volumes II, III and IV of this report contain the detailed performance data estimates for the GE27/T3 Study A1, TF34/T7 Study A1 and F404/T1 Study A1 turboprop engines, respectively. (Author)

AD-A089 337/0 PC **A05**/MF **A01**
General Electric Co Lynn MA Aircraft Engine Group
Maritime Patrol Aircraft Engine Study, General Electric Derivative Engines. Volume IV. Appendix C - Performance Data - F404/T1 Study A1 Turboprop.
Final rept. Oct 78-Apr 79,
R. Hirschkron, R. H. Davis, and R. E. Warren. 30 Apr 79, 81p R79AEG052-VOL-4, NADC-79133-60-VOL-4
Contract N62269-78-C-0414
See also Volume 1, AD-B051 072L.

This study developed data on General Electric common core derivative engines for use in Maritime Patrol Aircraft (MPA) concept formulation studies. The study included the screening of potential General Electric turbofan and turboprop/turboshaft engines and the preparation of technical and planning information on three of the most promising engine candidates. Screening of General Electric derivative candidates was performed utilizing an analytical MPA model using synthesized mission profiles to rank the candidates in terms of fuel consumption, weight, cost and complexity. The three turboprop engines selected for further study were as follows: TF34 growth derivative version with boost and new LPT (TF34/T7 Study A1), F404 derivative with booster stages and new LPT (F404/T1 Study A1), and GE27 scaled and boosted study engine (GE27/T3 Study A1). Volume I summarizes the screening analysis and contains technical, planning, installation, cost and development data for the three selected turboprop engines. Volumes II, III and IV of this report contain the detailed performance data estimates for the GE27/T3 Study A1, TF34/T7 Study A1 and F404/T1 Study A1 turboprop engines, respectively. (Author)

AD-A089 365/1 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
An Analysis of Air Force Management of Turbine Engine Monitoring Systems (TEMS).
Master's thesis,
Elbert B. Hubbard, III, and Gregory A. Swecker. Jun 80, 118p Rept no. AFIT-LSSR-68-80

Turbine Engine Monitoring Systems (TEMS) are engine health monitoring and diagnostic tools being developed and tested for use on Air Force engines in order to improve and reduce the cost of engine maintenance and management and to aid in the implementation of On Condition Maintenance. Previous researchers have described the major features of TEMS, analyzed the results of development and test efforts, and identified problems which must be overcome. This study examines the problem of fragmentation which exists in the Air Force management of TEMS development and testing. The authors describe and analyze the overall Air Force management of TEMS. Management problems were identified and classified into three major areas: structure and role problems, information flow and integration problems, and leadership and command problems. Four alternative management concepts were analyzed. Based on this analysis, the authors recommend that the management structure be modified, and a TEMS Task Force be established to more effectively utilize TEMS for Air Force engine maintenance and management. (Author)

AD-A089 524/3 PC **A05**/MF **A01**
Pratt and Whitney Aircraft Group West Palm Beach FL Government Products Div
Disk Residual Life Studies. Part 2. TF30 10th-Stage Compressor Disk (INCOLOY 901).
Final rept. 1 Apr 76-30 Jun 79,
J. S. Cargill, J. K. Malpani, and Y. W. Cheng. Dec 79, 96p PWA-FR-11878-PT-2, AFML-TR-79-4173
Contract F33615-76-C-5172

A residual fatigue life prediction method, suitable for Retirement-for-Cause application, has been developed for two P&WA turbine disks: the F100 1st-stage high pressure turbine disk and the TF30 10th-stage compressor disk. The method is based upon interaction of fracture mechanics crack propagation modeling concepts with laboratory nondestructive evaluation (NDE) techniques. Fracture mechanics life models were developed using the GPD hyperbolic sine (SINH) model refined during an earlier Air Force Materials Laboratory (AFML) program. Stress intensity (K) solutions for the engine components were based upon experimental effective K determinations made during full-scale component fatigue tests. The NDE techniques developed for disk inspections included acoustic emission (AE), eddy current (EC), and fluorescent penetrants (FP). Stress-enhanced penetrant and semi-automated rotating probe EC techniques were developed as periodic inspections, while the AE time-domain technique was developed as a real-time inspection tool. (Author)

AD-A089 629/0 PC **A05**/MF **A01**
Systems Research Labs Inc Dayton OH Aerosystems Group
Aircraft Engine Nacelle Fire Test Simulator. Volume I. Technical.
Final rept. Sep 76-Apr 80,
Karlheinz O. W. Ball, Dennis B. Burnsides, Rolf D. Hegele, and Paul R. Hughes. Apr 80, 82p
AFWAL-TR-80-2055-VOL-1
Contract F33615-76-C-2084

This report describes the design, installation, and initial checkout of the Aircraft Engine Nacelle Fire Test Simulator. This facility was designed to realistically reproduce the environments and combustion-related phenomena encountered within an engine nacelle. The facility provides both heating and cooling of the inlet air, heating of the engine case, control of air velocity and air pressure, and for the injection of fluids, combustibles or extinguishants. The report presents the final implementation of the system and details the hardware installation, the control system, and the software needed to provide integrated control, safety, and data acquisition. Only limited checkout was possible due to the failure of the air compressor and the cleaning and modification efforts required to return the system to a safe operating level.

N80-31342/2 PC **A08**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
The Application of Design to Cost and Life Cycle Cost to Aircraft Engines.
May 80, 168p AGARD-LS-107, ISBN-92-835-0265-5
Conf. Held at Saint Louis, France, 12-13 May 1980 and London, 15-16 May 1980.

No abstract available.

N80-31351/3 PC **A04**/MF **A01**
United Technologies Research Center, East Hartford, CT.
Influence of Mistuning on Blade Torsional Flutter.
A. V. Srinivasan. Aug 80, 55p NASA-CR-165137, R80-914545-16
Contract NAS3-21603

An analytical technique for the prediction of fan blade flutter was evaluated by utilizing first stage fan flutter data from tests on an advanced high performance engine. The formulation includes both aerodynamic and mechanical coupling among all the blades of the assembly. Mistuning is accounted for in the analysis so that individual blade inertias, frequencies, or damping can be considered. Airfoil stability was predicted by calculating a flutter determinant, the eigenvalues of which indicate the extent of susceptibility to flutter. When blade to blade differences in frequencies are considered, a stable system is predicted for the test points examined. For a tuned system, it was found that torsional flutter can be predicted at a limited number of interblade phase angles. Examination of these phase angles indicated that they were 'close' to the condition of acoustic resonance. For the range of Mach numbers and reduced frequencies considered, the so called subcritical flutter cannot be predicted. The essential influence of mechanical coupling among the blades is to change the frequencies of the system with little or no change in damping; however, aerodynamic coupling together with mechanical coupling could change not only frequencies, but also damping in the system, with a trend toward instability.

N80-31394/3 PC **A05**/MF **A01**
Aircraft Research Association Ltd., Bedford (England).
The Design of Axisymmetric Cowls for Podded Nacelles for High by-Pass Ratio Turbofan Engines.
M. J. Langley. May 79, 81p ARC-R/M-3846, BR74570
Supersedes Ara-54; Arc-38204.

The design and test of forecowl profiles for a podded engine nacelle of modern proportions, with the specific aim of obtaining favorable supercritical flow development over the cowl exterior is described. Six cowl shapes were tested, exploiting the pressure distribution principle previously evolved for high speed airfoils. Features of the measured surface pressure distributions over the cowls were related to the occurrence of drag rise, from either increase of Mach number or decrease of flow ratio (spillage). The level of high speed drag performance reached by the best cowl designs tested was equivalent to or slightly better than the corresponding optimum NACA 1-series cowl, superiority at low speed being retained throughout.

N80-31398/4 PC **A01**/MF **A01**
TRW, Inc., Cleveland, OH. Materials Technology.
Cost Analysis of Composite Fan Blade Manufacturing Processes.
Final Report.
T. S. Stelson, and C. F. Barth. Jun 80, 87p
NASA-CR-159676, TRW-ER-8064

Contract NAS3-21352

The relative manufacturing costs were estimated for large high technology fan blades prepared by advanced composite fabrication methods using seven candidate materials/process systems. These systems were identified as laminated resin matrix composite, filament wound resin matrix composite, superhybrid solid laminate, superhybrid spar/shell, metal matrix composite, metal matrix composite with a spar and shell, and hollow titanium. The costs were calculated utilizing analytical process models and all cost data are presented as normalized relative values where 100 was the cost of a conventionally forged solid titanium fan blade whose geometry corresponded to a size typical of 42 blades per disc. Four costs were calculated for each of the seven candidate systems to relate the variation of cost on blade size. Geometries typical of blade designs at 24, 30, 36 and 42 blades per disc were used. The impact of individual process yield factors on costs was also assessed as well as effects of process parameters, raw materials, labor rates and consumable items.

N80-31399/2 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Reverse Thrust Performance of the Qcsee Variable Pitch Turbofan Engine.
N. E. Samanich, D. C. Reemsnyder, and H. E. Blodmer. 1980, 57p NASA-TM-81558, E-519
Presented at the Aerospace Congr., Los Angeles, 13-16 Oct. 1980; Sponsored by AM. Soc. Of Automotive Engr.

Results of steady state reverse and forward to reverse thrust transient performance tests are presented. The original quiet, clean, short haul, experimental engine four segment variable fan nozzle was retested in reverse and compared with a continuous, 30 deg half angle conical exlet. Data indicated that the significantly more stable, higher pressure recovery flow with the fixed 30 deg exlet resulted in lower engine vibrations, lower fan blade stress, and approximately a 20 percent improvement in reverse thrust. Objective reverse thrust of 35 percent of takeoff thrust was reached. Thrust response of less than 1.5 sec was achieved for the approach and the trakeoff to reverse thrust transients.

N80-31400/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
An Experimental Evaluation of the Performance Deficit of an Aircraft Engine Starter Turbine.
J. E. Hass, R. J. Roelke, and P. Hermann. 1980, 21p NASA-TM-81571, E-539
Presented at the Aerospace Congr., Los Angeles, 13-16 Oct. 1980; Sponsored by AM. Soc. Of Automotive Engr.

An experimental investigation was made to determine the reasons for the low aerodynamic performance of a 13.5 centimeter tip diameter aircraft engine starter turbine. The investigation consisted of an evaluation of both the stator and the stage. An approximate ten percent improvement in turbine efficiency was obtained when the honeycomb shroud over the rotor blade tips was filled to obtain a solid shroud surface.

N80-31402/4 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Improved Components for Engine Fuel Savings.
R. J. Antl, and J. E. Mcaulay. 1980, 33p NASA-TM-81577, E-506
Presented at the Aerospace Congr., Los Angeles, 13-16 Oct. 1980; Sponsored by AM. Soc. Of Automotive Engr.

The Engine Component Improvement (ECI) Project formulated to address near term improvements for current engines is described with emphasis on the development of component technologies to reduce the fuel consumption of CF6, JT9D, and JT8D engines. The technical and economical acceptability and the fuel saving potential of nine concepts are demonstrated. Descriptions of these concepts, results of testing, and the status as to entering airline service are presented. Also presented is the status of the remaining concepts still under development.

N80-31404/0 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
Environmental Testing of Coatings for Gas Turbines.
A. J. A. Mom. 10 Jul 79, 14p NLR-MP-79028-U
Presented at 9TH Intern. Thermal Spraying Conf., Gravenhage, Netherlands, 19-23 May 1980.

An environmental test chamber was built to analyze the effects of air pollutants on gas turbine materials and components. Engine conditions including temperature, stress, thermal cycling and gas velocity are reproduced. Actual components or test pieces are tested according to realistic mission profiles using a flight by flight test procedure. Good agreement was obtained between corrosion behavior in service and that in the test rig.

N80-32186/2 PC **A12**/MF **A01**
Lockheed-Georgia Co., Marietta.
A Study of the Transmission Characteristics of Suppressor Nozzles.
K. K. Ahuja, M. Salikuddin, R. H. Burrin, and H. E. Plumbee, Jr. Jun 80, 263p NASA-CR-165133
Contract NAS3-20797

The internal noise radiation characteristics for a single stream 12 lobe 24 tube suppressor nozzle, and for a dual stream 36 chute suppressor nozzle were investigated. An equivalent single round conical nozzle and an equivalent coannular nozzle system were also tested to provide a reference for the two suppressors. The technique utilized a high voltage spark discharge as a noise source within the test duct which permitted separation of the incident, reflected and transmitted signals in the time domain. These signals were then Fourier transformed to obtain the nozzle transmission coefficient and the power transfer function. These transmission parameters for the 12 lobe, 24 tube suppressor nozzle and the reference conical nozzle are presented as a function of jet Mach number, duct Mach number polar angle and temperature. Effects of simulated forward flight are also considered for this nozzle. For the dual stream, 36 chute suppressor, the transmission parameters are presented as a function of velocity ratios and temperature ratios. Possible data for the equivalent coaxial nozzle is also presented. Jet noise suppression by these nozzles is also discussed.

N80-32188/8 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Experimental Investigation of the Radiation of Sound from an Unflanged Duct and a Bellmouth, Including the Flow Effect.
J. M. Ville, and R. J. Silcox. Aug 80, 65p NASA-TP-1697, L-13252

The radiation of sound from an inlet as a function of flow velocity, frequency, duct mode structure, and inlet geometry was examined by using a spinning mode synthesizer to insure a given space-time structure inside the duct. Measurements of the radiation pattern (amplitude and phase) and of the pressure reflection coefficient were obtained over an azimuthal wave number range of 0 to 6 and a frequency range up to 5000 Hz for an unflanged duct and a bellmouth. The measured radiated field and pressure reflection coefficient without flow for the unflanged duct agree reasonably well with theory. The influence of the inlet contour appears to be very drastic near the cut-on frequency of a mode and reasonable agreement is found between the bellmouth pressure reflection coefficient and a infinite hyperboloidal inlet theory. It is also shown that the flow has a weak effect on the amplitude of the directivity factor but significantly shifts the directivity factor phase. The influence of the flow on the modulus of the pressure reflection coefficient is found to be well described by a theoretical prediction.

21G. Reciprocating Engines

AD-A089 535/9 PC **A02**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground MD
Engine Cold-Starting and Warm-Up Tests.
Final rept. on test operations procedure.
18 Jul 80, 13p Rept no. TOP-2-2-650
Supersedes Rept. no. TOP-2-2-650, AD-A062 736.

This report describes procedures for evaluating the cold-starting capability of military engines with and without the aid of arctic-kit engine heaters. (Author)

21H. Rocket Motors and Engines

AD-A089 158/0 PC **A08**/MF **A01**
Ogden Air Logistics Center Hill AFB UT Propellant Analysis Section
LGM-30B, Stage II Dissected Motors Test Report,
Daryl Anderson. Jul 80, 156p Rept no. MAKPH-443(80)

This report contains the data obtained from testing propellant and case bond materials from two dissected Minuteman Stage II motors. The tests conducted were in accordance with Service Engineering (MMWRME) General Test Directive GTD-1 Dissect dated 28 June 1974. The directive specifies the tests required to elucidate any age induced problems which may affect the service life of the Stage II motor. Linear regression analysis was used to indicate trends of the test parameters. A representative regression plot was made of several parameters with each motor tested to date identified by different symbols. The regression analysis normally verified the trends established during the last test phase. Although there were a few trends which changed from significant to non-significant and a few that changed from non-significant to significant it does not seem likely that any problems of major concern are apparent at this time. (Author)

AD-A089 306/5 PC **A04**/MF **A01**
Air Force Rocket Propulsion Lab Edwards AFB CA
Stability Prediction for Solid Propellant Rocket Motors with High Speed Mean Flow.
Final rept.,
Gary A. Flandro. Aug 80, 57p Rept no. AFRPL-TR-79-98

Current stability prediction calculations for solid propellant rocket motors are based upon a simple first-order perturbation solution which assumes an incompressible chamber mean flow. Since combustion instability is frequently observed in motors with large length-to-diameter and low port-to-throat area ratios, there is concern that the standard stability techniques should be extended to apply to cases where high-speed mean flows are present. This report shows how the basic stability analysis can be extended by carrying additional terms in the perturbation expansions. Compressibility affects the calculations in several ways. The acoustic mode shapes predicted in the linear model are distorted and the mean thermodynamic properties may vary significantly from point to point in the chamber. These variations and distortions alter both the predicted growth rates and also the frequencies for the acoustic modes. Detailed calculations are carried out for a cylindrical grain geometry with longitudinal wave motions. Frequency and growth rate corrections grow quadratically with increases in the port length-to-diameter ratio. Frequency shifts of as much as 30 percent of the linear acoustic frequency predictions may be expected in high L/D motors. (Author)

N80-31449/5 PC **A15**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Large Space Systems/Low-Thrust Propulsion Technology.
Jul 80, 347p NASA-CP-2144, E-510
Meeting Held at Cleveland, 20-21 May 1980.

No abstract available.

21I. Rocket Propellants

AD-A089 593/8 PC **A02**/MF **A01**
Propellants Explosives and Rocket Motor Establishment Westcott (England)
The Use of an Arc Image Furnace for Solid Propellant Ignition Studies. An Undergraduate Student Report,
Jacqueline Bernadette Dawes. May 80, 24p PERME-MEMO-111, DRIC-BR-74602

The arc image furnace is a laboratory device which may be used to ignite rocket propellant, simulating the conditions of overall heat flux and pressure levels obtained in the rocket motor. Ignition in a motor is usually initiated by a pyrotechnic device which produces a heating effect mainly by conduction of heat by hot particles impinging on the propellant surface and convective heating from the hot gases flowing over the surface. There is only a small proportion of the heat transferred by radiation from the igniter products. In the arc image furnace, however, radiant heat is the means used for igniting the propellant. Thus it is not an absolute test of ignition delay, but it gives an indication of the delays which may be expected from a solid propellant. (Author)

N80-31423/0 PC **A09**/MF **A01**
General Dynamics/Convair, San Diego, CA.
Conceptual Design of an Orbital Propellant Transfer Experiment. Volume 2: Study Results.
G. L. Drake, C. E. Bassett, F. Merino, L. E. Siden, and R. E. Bradley. Aug 80, 196p NASA-CR-165150, GDC-ASP-80-013-V-2
Contract NAS3-21935

The OTV configurations, operations and requirements planned for the period from the 1980's to the 1990's were reviewed and a propellant transfer experiment was designed that would support the needs of these advanced OTV operational concepts. An overall integrated propellant management technology plan for all NASA centers was developed. The preliminary cost estimate (for planning purposes only) is $56.7 M, of which approximately $31.8 M is for shuttle user costs.

22.

SPACE TECHNOLOGY

22A. Astronautics

N80-31418/0 PC **A09**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Materials Processing in Space Program Tasks.
Fiscal Year, 1980.
R. J. Naumann. Aug 80, 193p NASA-TM-78294

The history, strategy, and overall goal of NASA's Office of Space and Terrestrial Applications program for materials processing in space are described as well as the organizational structures and personnel involved. An overview of each research task is presented and recent publications are listed.

N80-31419/8 PC **A08**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Materials Processing in Space, 1980 Science Planning Document.
R. J. Naumann. Aug 80, 167p NASA-TM-78297

The scientific aspects of the Materials Processing in Space program are described with emphasis on the major categories of interest: (1) crystal growth; (2) solidification of metals, alloys, and composites; (3) fluids and chemical processes; (4) containerless processing, glasses, and refractories; (5) ultrahigh vacuum processes; and (6) bioprocessing. An index is provided for each of these areas. The possible contributions that materials science experiments in space can make to the various disciplines are summarized, and the necessity for performing experiments in space is justified. What has been learned from previous experiments relating to space processing, current investigations, and remaining issues that require resolution are discussed. Recommendations for the future direction of the program are included.

N80-31420/6 PC **A14**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Report on Active and Planned Spacecraft and Experiments.
R. Horowitz, and R. W. Nostreys. Aug 80, 319p NASA-TM-80905, NSSDC/WDC-A-R/S-80-06

Information on current and planned spacecraft activity for a broad range of scientific disciplines is presented. The information covers a wide range of disciplines: astronomy, Earth sciences, meteorology, planetary sciences, aeronomy, particles and fields, solar physics, life sciences, and material sciences. These spacecraft projects represent the efforts and funding of individual countries as well as cooperative arrangements among different countries.

N80-31421/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Certain Problems of Space Biotechnology.
V. N. Gilyarov. Jun 80, 12p NASA-TM-76235, PR-345
Contract NASW-3198
Transl. Into English of "Nekotoryye Zadachi Kosmicheskoy Bioteknologii", Rept. Pr-345 Acad. Of Sci. USSR, Moscow, 1977 p 1-13. Transl. By Scientific Translation Service, Santa Barbara, Calif.

Experiments in the field of biotechnology conducted by the USA Apollo and Skylab space probes are described, as well as the joint Soviet-American Apollo-Soyuz Test Project (ASTP). Experiments in electrophoretic separation in space of biological compounds in a liquid medium are detailed. Space processing of vaccines and separation of human and animal cells are described. Methyl-cellulose, a coating for use in electrophoresis was developed. Erythropoietin, which stimulates the formation of red blood corpuscles in bone marrow, was obtained in pure form.

N80-31422/2 PC **A03**/MF **A01**
KMS Fusion, Inc., Ann Arbor, MI. Div. of Material Sciences
Glass Shell Manufacturing in Space.
Semiannual Report, Dec. 1979 - May 1980.
R. L. Nolen, Jr., M. A. Ebner, and R. L. Downs. 25 Jun 80, 27p NASA-CR-161556
Contract NAS8-33103

A heat transfer model was developed that mathematically describes the heating and calculates the thermal history of a gel particle in free-fall through the furnace. The model parameters that greatly affect the calculations were found to be gel particle mass, geometry, specific heat, and furnace gas. Empirical testing of the model has commenced. The code calculations and the initial empirical testing results both indicate that the gel-to-shell transformation occurs early and rapidly in the thermal history of the gel particle, and that for current work the heat transfer rate is not a limitation in shell production.

N80-31425/5 PC **A05**/MF **A01**
European Space Agency, Paris (France).
Investigations into the Electrodeposition of Dispersion Layers under Zero Gravity Conditions.
J. Ehrhardt. Nov 79, 82p ESA-TT-574, BMFT-FB-W-77-11
Transl. Into English of "Studie ueber die Galvanische Abscheidung von Dispersionsschichten Unter Weltraumbedingungen", Rept. Bmft-FB-W-771 Bundesmin. Fuer Forschung und Technol., Dec. 1977. Original Report in German Previously Announced as N79-30347.

Spacelab experiments are proposed to investigate the behavior of particles suspended in an electrolyte during migration to the cathode and during their incorporation in the deposition layer. The precise deposition mechanism is unknown and the transport of the dispersoid to the cathode cannot be investigated under terrestrial conditions because of sedimentation and convection. A survey of the literature was made regarding deposition mechanisms, increase of strength, hardness and resistance to oxidation, improvement of the wear resistance, dry lubrication, and improvement of corrosion behavior. Design considerations for an electrolytic cell were defined to the extent that a laboratory version can be constructed.

N80-31440/4 PC **A11**/MF **A01**
Analytic Sciences Corp., Reading, MA.
Space Shuttle Navigation Analysis. Volume 1: GPS Aided Navigation.
Final Report.
G. A. Matchett, M. A. Vogel, and T. J. Macdonald. 31 May 80, 245p NASA-CR-160765, TR-1001-1-1-V-1
Contract NAS9-15151

Analytical studies related to space shuttle navigation are presented. Studies related to the addition of NAVSTAR Global Positioning System user equipment to the shuttle avionics suite are presented. The GPS studies center about navigation accuracy covariance analyses for both developmental and operational phases of GPS, as well as for various orbiter mission phases.

N80-31441/2 PC **A05**/MF **A01**
Analytic Sciences Corp., Reading, MA.
Space Shuttle Navigation Analysis. Volume 2: Baseline System Navigation.
Final Report.
H. L. Jones, G. Luders, G. A. Matchett, and R. G. Rains. 30 May 80, 99p NASA-CR-160766, TR-1001-1-1-V-2
Contract NAS9-15151

Studies related to the baseline navigation system for the orbiter are presented. The baseline navigation system studies include a covariance analysis of the Inertial Measurement Unit calibration and alignment procedures, postflight IMU error recovery for the approach and landing phases, on-orbit calibration of IMU instrument biases, and a covariance analysis of entry and prelaunch navigation system performance.

N80-31445/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX. Mission Planning and Analysis Div.
STS-1 Operational Flight Profile. Volume 4: On-orbit Profile-Cycle 3.1.1.
Jul 80, 41p NASA-TM-82183, JSC-16683-V-4
Supersedes Jsc-14483; Rept-78-FM-51-Rev-1.

The orbital flight test (OFT) phase of the shuttle program consists of four orbital flights beginning in November 1980and continuing through 1981. The major purpose of the OFT program is to demonstrate and verify shuttle systems and flight capabilities by satisfying the OFT requirements, is presented. The onorbit portion of the operational flight profile (OFP) for the first Space Transportation System-1 (STS-1) flight is presented. This onorbit document (volume 4) is one in a series that, taken together, will define the STS-1 OFP. This OFP onorbit document represents a combination of the STS-1 ground rules and constraints and the initialization data. The STS-1 flight activities described reflect the trajectory, consumable, crew activity, and flight requirement baseline as of May 1, 1980. Flight plans for the ascent, onorbit, and descent phases of the test flight are presented.

N80-31446/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX. Mission Planning and Analysis Div.
Level B/C Software Ground Navigation Program. Delta-T Processor.
Aug 80, 45p NASA-TM-82184, JSC-16728
Supersedes Rept-79-FM-1.

The Delta-T Processor (DTP) computes the instantaneous downtrack error in a specified orbiter on-

board navigation state vector recovered via downlink telemetry. The downtrack error, expressed in units of time, is computed based on current incoming Earth based range and Doppler navigation tracking data and the ground selected onboard navigation state vector. The computed time difference when used to modify the timetag of the vector used for onboard navigation reduces the instantaneous downtrack error in this vector to within the threshold of the DTP, the input data, and the onboard software. This threshold is currently estimated to be approximately 2 to 4 nautical miles. The DTP is not restricted to using only onboard vectors. Any vector, either input via the manual entry device or accessible via the vector administration table, may be used. The DTP does not require that both data types be available.

22B. Spacecraft

AD-A089 597/9 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Prediction of Spacecraft Potentials at Geosynchronous Orbit.
H. B. Garrett, A. G. Rubin, and C. P. Pike. 1980, 17p Rept no. AFGL-TR-80-0239
Pub. in Solar-Terrestrial Predictions Proceedings, v8 n120 1980.

No abstract available.

AD-A089 618/3 PC **A04**/MF **A01**
Tennessee Univ Space Inst Tullahoma
Control Optimization for a Dual-Mode Single-State Nuclear Shuttle.
Thomas Conley Powell, and Susan Gay Dodd. 1980, 62p AFOSR-TR-80-0753
Contract F49620-79-C-0166

The performance of a single-stage surface-to-orbit shuttle--whether chemical-propellant or nuclear--can be considerably improved by 'mixed-mode' propulsion. A mixed-mode shuttle would be fitted with engines designed to use two different propellant combinations--a highthrust (mode 1) propellant, such as ammonia, and a high-specific-impulse (mode 2) propellant, such as hydrogen. The first step in the evaluation of the mixed-mode nuclear shuttle is a preliminary trajectory optimization study. This study, using a simple mission and a simple shuttle model, would be the basis for more complex trajectory optimization studies. The problem considered in this thesis is that of minimizing the propellant expenditure of a mixed-mode nuclear shuttle for a given orbit. The starting point for any optimization problem is a mathematical modle of the system, in state variable form. Application of the methods of optimal control theory results in a two-point boundary-value problem and an associated algebraic problem. Three numerical methods are briefly described which could be used to solve these problems. The analysis of the problem is given in detail, along with numerical results for various combinations of the input variables, and the finite-differece computer program, properly documented.

N80-31437/0 PC **A04**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Scientific Services Div.
Processing of Meteosat Attitude Measurement Flight Data and Evaluation of the Performance of an Adaptive Filtering Technique.
C. R. Traas, and G. Moek. 18 Aug 78, 69p NLR-TR-78146-U
Contract ESTEC-3319/77

The attitude measurement data of the geosynchronous spacecraft Meteosat were analyzed using an adaptive recursive filtering technique. The mathematical models of spacecraft dynamics and sensors were kept very simple. Modeling errors are such that without adaptive feedback, strong divergence of the filtering process occurs. It is shown that the adaptive process stabilizes the filtering considerably. Complete error consistently, however, could not be attained in the present case. The background of this latter fact is analyzed.

N80-31438/8 PC **A04**/MF **A01**
Northrop Corp., Hawthorne, CA. Aircraft Group.
Space Shuttle Orbiter Flow Visualization Study.
D. J. Lorincz. Feb 80, 68p NASA-CR-163092, NOR-80-82
Contract NAS4-2616
Original Contains Color Illustrations.

The vortex flows generated at subsonic speed during the final portion of atmospheric reentry were defined using a 0.01 scale model of the orbiter in a diagnostic water tunnel. Flow visualization photographs were obtained over an angle-of-attack range to 40 deg and sideslip angles up to 10 deg. The vortex flow field development, vortex path, and vortex breakdown characteristics were determined as a function of angle-of-attack at zero sideslip. Vortex flows were found to develop on the highly swept glove, on the wing, and on the upper surface of the fuselage. No significant asymmetries were observed at zero sideslip in the water tunnel tests. The sensitivity of the upper surface vortex flow fields to variations in sideslip angle was also studied. The vortex formed on the glove remained very stable in position above the wing up through the 10 deg of sideslip tested. There was a change in the vortex lifts under sideslip due to effective change in leading-edge sweep angles. Asymmetric flow separation occurred on the upper surface of the fuselage at small sideslip angles. The influence of vortex flow fields in sideslip on the lateral/ directional characteristics of the orbiter is discussed.

N80-31442/0 PC **A07**/MF **A01**
Fairchild Stratos Corp., Manhattan Beach, CA.
Space Transportation System Disconnect.
Final Report.
5 Mar 80, 145p NASA-CR-161565, ER-76300-5
Contract NAS8-32806

The use of medium duty 300 psi fluid disconnects for orbital servicing was demonstrated to be both practical and technically feasible. A prototype disconnect was designed and tested, based on criteria formulated from a survey of expected usage requirements for orbital servicing concepts. Testing involved the comparison of three seal materials (EPR, Neoprene and Teflon), and two test media (helium and Freon 21), and was conducted over a temperature range of -150 F to +225 F. Results indicate low helium leakage (10 to the -4 power sccs) and extremely low engagement forces (56 lb sub f). Testing was also performed on a new seal design. Design concepts for a cryogenic disconnect and a high pressure disconnect were investigated. Results of an industry survey for usable orbital servicing disconnects and areas needing attention in future studies are discussed.

N80-31443/8 PC **A06**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
The Prevention of Electrical Breakdown and Electrostatic Voltage Problems in the Space Shuttle and Its Payloads. Part 1: Theory and Phenomena.
Final Report.
D. W. Whitson. 3 Feb 75, 110p NASA-TM-81137, JSC-09331-1-PT-1

An introduction to the theory of corona discharge and electrostatic phenomena is presented. The theory is mainly qualitative so that workers in the field should not have to go outisde this manual for an understanding of the relevant phenomena. Some of the problems that may occur with the space shuttle in regard to electrical discharge are discussed.

N80-31444/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
The Prevention of Electronical Breakdown and Electrostatic Voltage Problems in the Space Shuttle and Its Payloads. Part 2: Design Guides and Operations Considerations.
D. W. Whitson. 3 Feb 75, 48p NASA-TM-81138, JSC-09331-2-PT-2

The specific electrical discharge problems that can directly affect the shuttle vehicle and its payloads are addressed. General design guidelines are provided to assist flight hardware managers in minimizing these kinds of problems. Specific data are included on workmanship practices and system testing while in low pressure environments. Certain electrical discharge problems that may be unique to the design of the shuttle vehicle itself and to its various mission operational models are discussed.

N80-31447/9 PC **A04**/MF **A01**
Boeing Aerospace Co., Seattle, WA. Engineering Technology.
Design, Fabrication and Test of Graphite/Polyimide Composite Joints and Attachments for Advanced Aerospace Vehicles.
Quarterly Technical Progress Report, 1 Oct. 1979 - 31 Jan. 1980.
D. E. Skoumal. 15 Feb 80, 62p NASA-CR-159111, QTPR-4
Contract NAS1-15644

Bonded and bolted designs are presented for each of four major attachment types. Prepreg processing problems are discussed and quality control data are given for lots 2W4604, 2W4632 and 2W4643. Preliminary design allowables test results for tension tests and compression tests of laminates are included. The final small specimen test matrix is defined and the configuration of symmetric step-lap joint specimens are shown. Finite element modeling studies of a double lap joint were performed to evaluate the number of elements required through the adhesive thickness to assess effects of various joint parameters on stress distributions. Results of finite element analyses assessing the effect of an adhesive fillet on the stress distribution in a double lap joint are examined.

N80-31794/4 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
SSME Turbopump Bearing Analytical Study.
Final Report.
J. W. Kannel, and T. Merriman. 20 Aug 80, 33p NASA-CR-161554
Contract NAS8-33576

Three shuttle pump bearings operating under severe overspeed and shut-down conditions are evaluated. The specific parameters investigated include outer race stresses, cage stresses, cage-race drag, bearing heating, and crush loading. A quasi-dynamic version of the BASDAP computer code was utilized which involved the calculation of ball-race forces (inner and outer), contact pressures, contact dimensions, and contact angles as a function of (1) axial load, (2) radial load, and (3) centrifugal load on the bearing. Generally, radial loads on the order of 13,300 N (3000 pounds) per bearing or 26,700 N (6000 pounds) per bearing pair, could be expected to cause severe problems to any of the bearings with a 17,800 N (4000 pounds) axial load. Further, when possible temperature excursions are considered, even a load of 8900 N (2000 pounds) may be excessive. However, high momentary radial loads with a 3800 N (850 pounds) axial load would not be anticipated to cause catastrophic failure of the fuel pump bearing.

N80-31803/3 PC **A06**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France). Div. des Systemes Balistiques et Spatiaux.
Bistable Solenoid Valve, Volume 1 Electrovanne Bistable a Verrouillage.
Final Report.
B. Gosse. 24 Jul 79, 108p MU/LR-97.091/79-V-1, ESA-CR(P)-1306-V-1
Contract ESTEC-2946/76-NL-AK
Text in French.

The specification, design, test procedures and results for a solenoid valve are presented. The bistable valve is to be used in pneumatic circuits up to 300 bars and in hydrazine circuits in aerospace applications. Total weight is less than 0.25 kg. Pressure drop is less than 0.1 bar for 10 g/s hydrazine flow or 1 g/s nitrogen flow. A position detection device based on hall effect cells is included. The test results show that the design is appropiate for space use. Comments are made on the admissible pressure drop at satellite life end, on the maximum opening pressure when working with liquids, and the replacement of the hall effect position detector by a shock detector device.

N80-31804/1 PC **A02**/MF **A01**
National Centre of Tribology, Risley (England). European Space Tribology Lab.
Activities of the European Space Tribology Laboratory for 1979.
Progress Report.
E. J. Robbins. Feb 80, 14p ESA-ESTL-44, ESA-CR(P)-1342
Contract ESA-2584/75-MD
Original Contains Color Illustrations.

Solar array drive mechanism tests, tilt mechanism tests, development of test techniques, development of solid lubricants for ball bearings, calculations of ball bearing torque and stiffness, slip-ring developments, and studies on relative lubricities of oils in vacuum are discussed. Four out of thirty requests for consulting involved small experimental programs which are summarized.

22C. Spacecraft Trajectories and Reentry

N80-31424/8 PC **A11**/MF **A01**
Analytical and Computational Mathematics, Zurich (Switzerland).
Interplanetary Two Point Boundary Value Problems: Extension of the Unified System for Orbit Computation (USOC), Volume 4.
Dec 79, 241p ESA-CR(P)-1347
Contract ESOC-3488/78-D-IM(SC)

The unified system for orbit computation was extended to allow the resolution of two point boundary value problems for interplanetary flight computation. The implementation is done in three different stages corresponding to three levels of accuracy: unperturbed patched conics method, method of matched asymptotic expansions, and numerical quasilinearization method.

N80-31426/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
On the Secular Decrease in the Semimajor Axis of Lageos Orbit.
D. P. Rubincam. Jul 80, 43p NASA-TM-80734
Submitted for Publication.

The semimajor axis of the Lageos orbit is decreasing secularly at the rate of -1.1 mm/day due to an unknown force. Nine possible mechanisms are investigated. Five of the mechanisms, resonance with the Earth's gravitational field, gravitational radiation, the Poynting-Robertson effect, transfer of spin angular momentum to the orbital angular momentum, and drag from near Earth dust are ruled out because they are too small to require unacceptable assumptions to account for the observed rate. Three other mechanisms, the Yarkovsky effect, the Schach effect, and terrestrial radiation pressure could possibly give the proper order of magnitude for the decay rate, but the characteristic signatures of these perturbations do not agree with the observed secular decrease. Atmospheric drag from a combination of charged and neutral particles is the most likely cause for the orbital decay. This mechanism explains at least 71 percent of the observed rate of decrease of the semimajor axis.

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